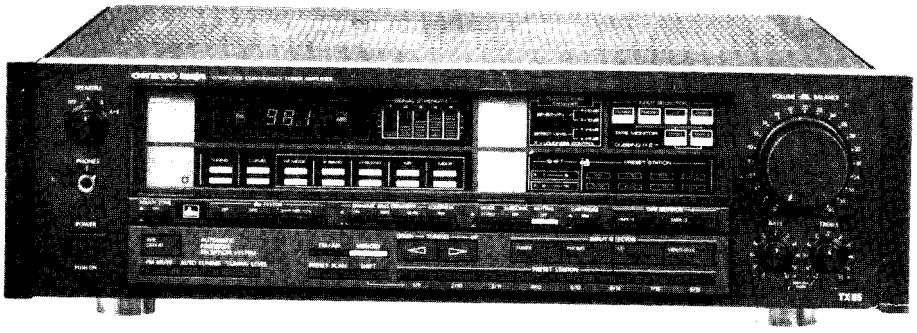
SERIA NO. 3188

ONKYO SERVICE MANUAL

COMPUTER CONTROLLED

TUNER AMPLIFIER

MODEL TX-85



UD, UDN, BUD, BUDN	120V AC, 60Hz
UW, BUW	120 or 220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Amplifier Section

Power output:	80 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.02% THD.
Total Harmonic Distortion:	0.02% at rated power
IM Distortion:	0.02% at rated power
Damping Factor:	50 at 8 ohms
Frequency Response:	20 – 30,000 Hz ±1dB
RIAA Deviation:	20 – 20,000 Hz ±0.5dB
Sensitivity and Impedance:	Phono(MM): 2.5mV/50 kohms Phono(MC): 350μV/330 ohms Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.3 kohms (phono)
Phono Overload:	180mV RMS at 1 kHz, 0.02% THD
Signal-to-Noise Ratio:	Phono(MM): 93dB (at 10mV input, A weighted) 76dB (IHF A-202) Phono(MC): 88dB (at 5mV input, A weighted) 67dB (IHF A-202) Tape: 98dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: ±8dB at 70Hz Treble: ±8dB at 20kHz
Loudness (–30dB):	+6dB at 70Hz, +5dB at 20kHz
Subsonic:	15Hz (–6dB/oct.)

Tuner Section

FM:

Tuning Range:	87.9 – 107.9MHz (200kHz stepts)
Usable Sensityvity:	Mono: 10.3dBf, 1.8μV Stereo: 17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono: 14.7dBf, 3.0μV Stereo: 37.2dBf, 40μV
Capture Ratio:	1.3dB
Image Rejection Ratio:	80dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 76dB Stereo: 70dB
Alternate Channel Attenuation:	70dB (IF Narrow)
AM Suppression Ratio:	55dB
Harmonic Distortion:	Mono: 0.10% (IF Wide) Stereo: 0.18% (IF Wide)
Frequency Response:	30 – 15,000Hz ±1.5dB
Stereo Separation:	40dB at 1kHz 30dB at 100 – 10,000Hz
Tuning Level (Hi/Lo):	27.2dBf, 13μV/17.2dBf, 4μV
Stereo Threshold:	17.2dBf, 4μV (Lo)

AM:

Tuning Range:	530 – 1620kHz (10kHz steps)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.8%

GENERAL

Power Supply:	AC 120V, 60Hz
Semiconductors:	FETs: 16 TRs: 98 ICS: 27 Diodes: 151
Dimensions (WxHxD):	480 x 142 x 460mm (18 7/8" x 5 5/8" x 18 1/8")
Weight:	15kg., 33lbs.

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. **Replacing the fuses**

For continued protection against fire hazard, replace only with same type and same rating fuse.

	120 model	
Circuit No.	Part No.	Description
F921	252051	6A (ST-6), Primary fuse
	Universal model	
F921	252051	6A (ST-6), Primary fuse for 120V
F922	252076	3.15A-SE-EAK, Primary fuse for 220V

2. **Replacing the lamps**

This unit uses the lamp listed below.

Circuit no.	Parts no.	Desciption
PL921	210064A	PL 6.3V, 250mA, Dial plate illumination

3. **Safety-check out (D model)**

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and nickel screw on the back panel.

Specification: 3.3MΩ ±10% at 500V

4. **Change of De-emphasis**

W models are equipped with a 50μsec-75μsec selector switch. This switch is located on the back panel. This switch is set to 50μsec at the factory, but may have to be reset to 75μsec depending on the area where the unit is used.

Europe: 50μsec

U.S.A.: 75μsec

5. **Change of voltage**

W models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

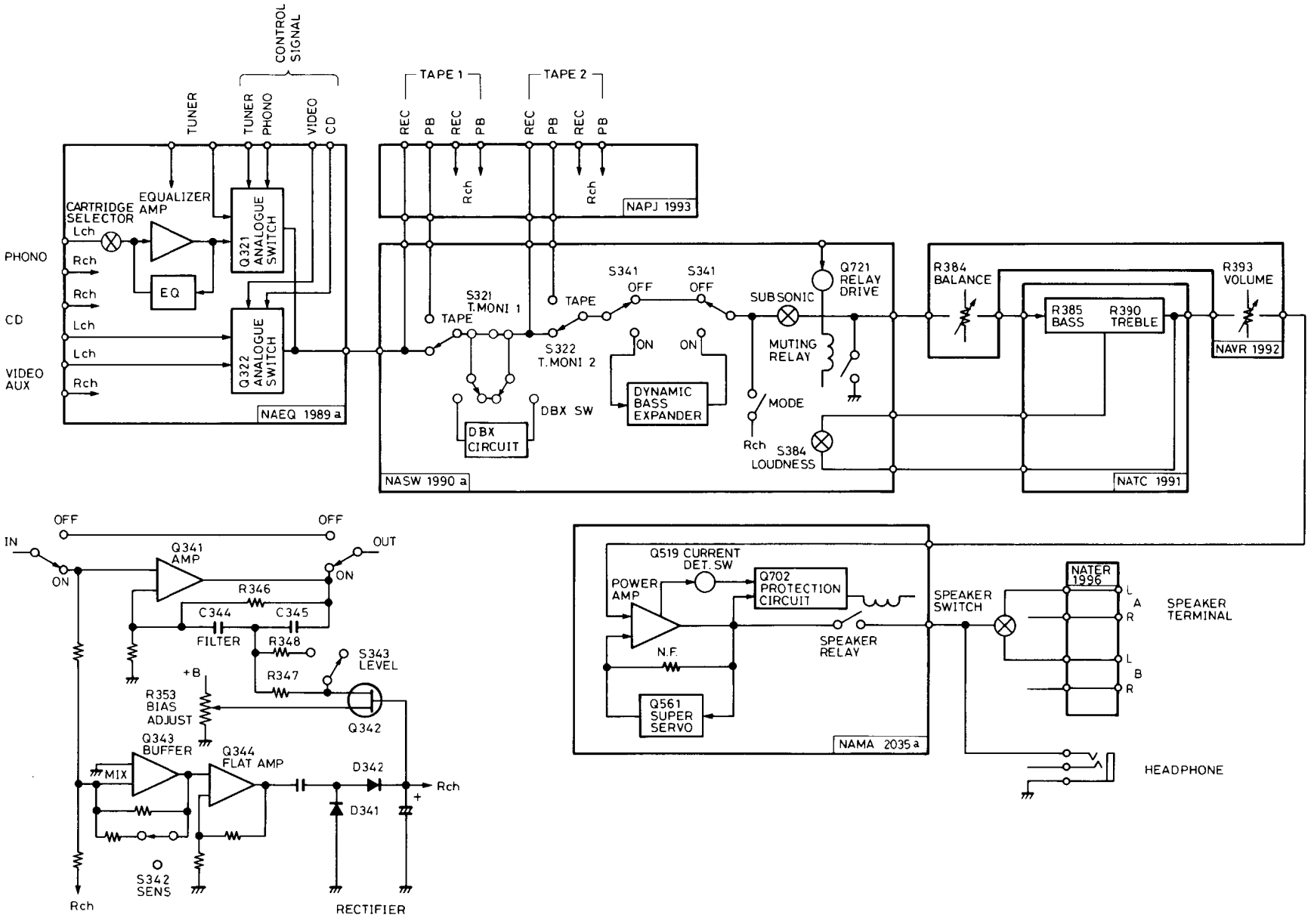
6. **Memory Preservation**

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operable. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and the location and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

TABLE OF CONTENTS

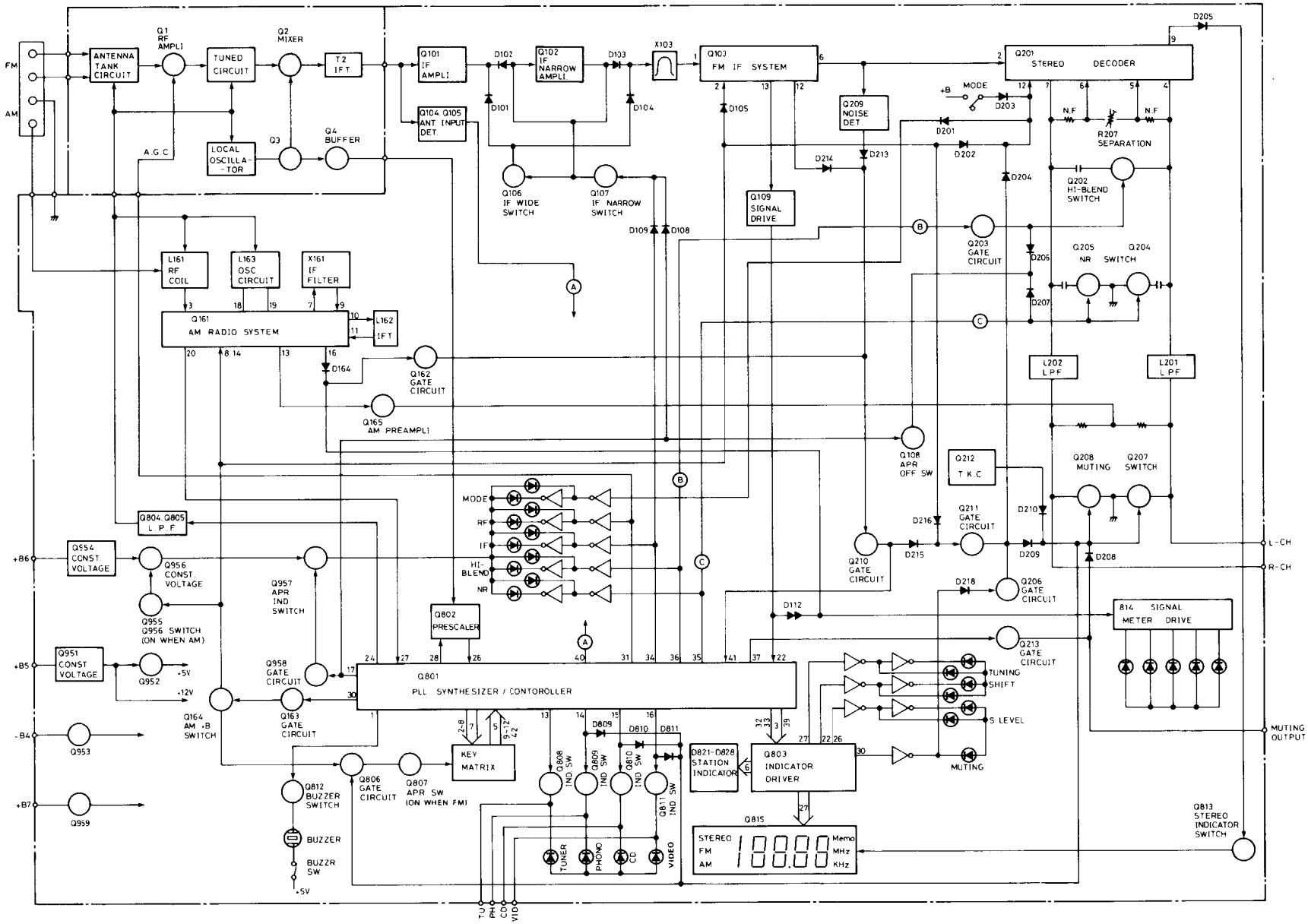
BLOCK DIAGRAM

— Amplifier section —



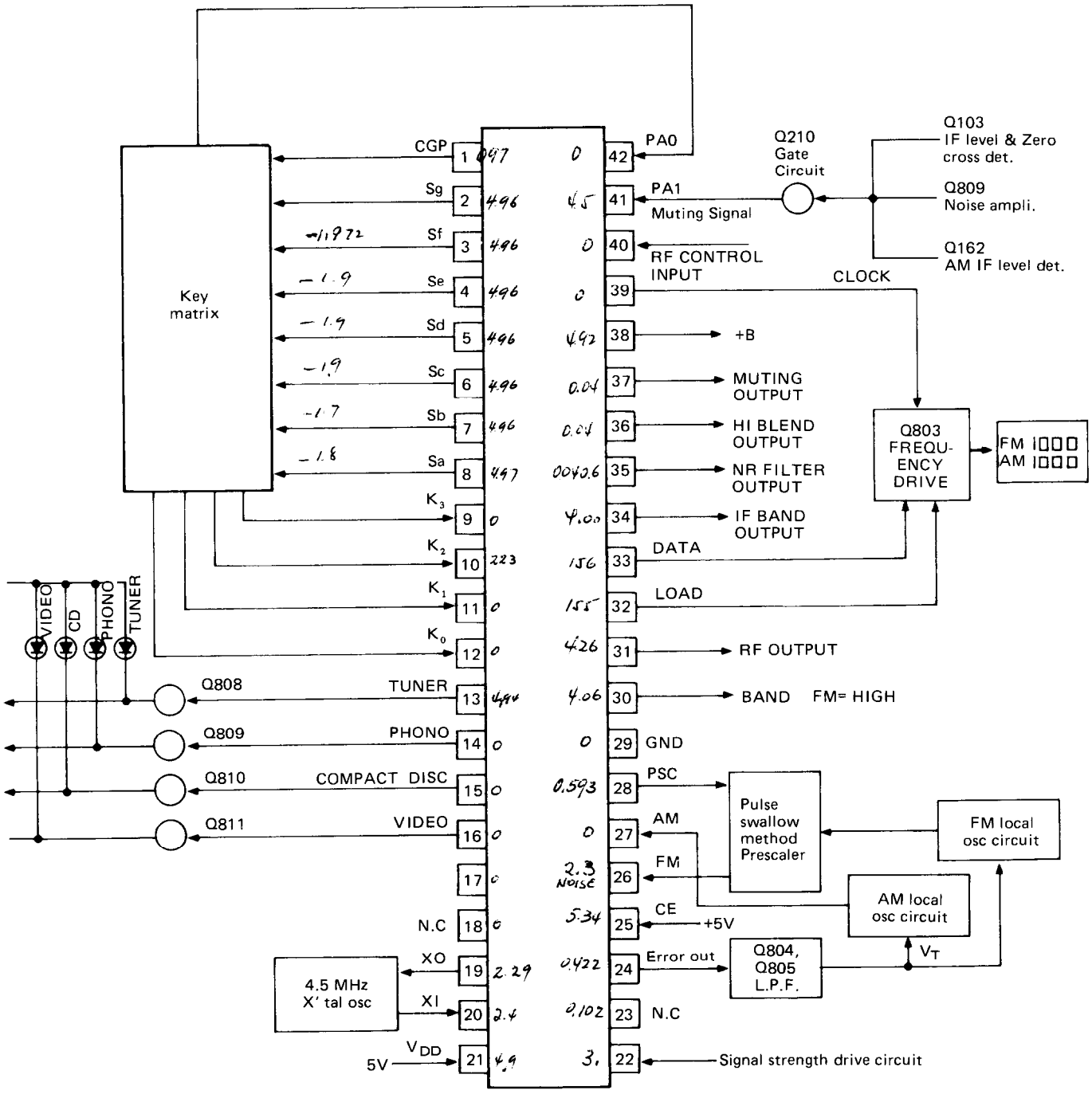
BLOCK DIAGRAM

— Tuner section —



BLOCK DIAGRAM OF IC

μPD1712CU-712-513 (Synthesizer and controller)

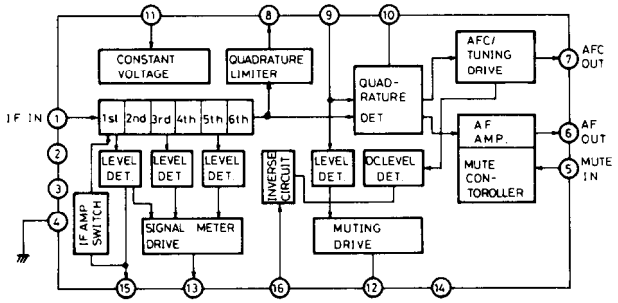


Matrix circuit

	PAD (42)	K3 (9)	K2 (10)	K1 (11)	K0 (12)
Sg (2)	MEMORY	UP	DOWN	AUTO/MANUAL	FM/AM
Sf (3)	DISPLAY	PROGRAM	AUTO MEMORY	PRESET SCAN	
Se (4)	M5/M15	M4/M14	M3/M13	M2/M12	M1/M11
Sd (5)	M10/M20	M9/M19	M8/M18	M7/M17	M6/M16
Sc (6)	DNR	HI-BLEND	IF	RF	MUTE LEVEL
Sb (7)	PHONO	TUNER	SIGNAL/FREQ	MUTING	MONO/STEREO
Sa (8)	TEST	TAPE 2	APR DEFEAT	VIDEO	COMPACT DISC
CGP (1)	BAND 2	BAND 1	BAND 0	PRESET	APR

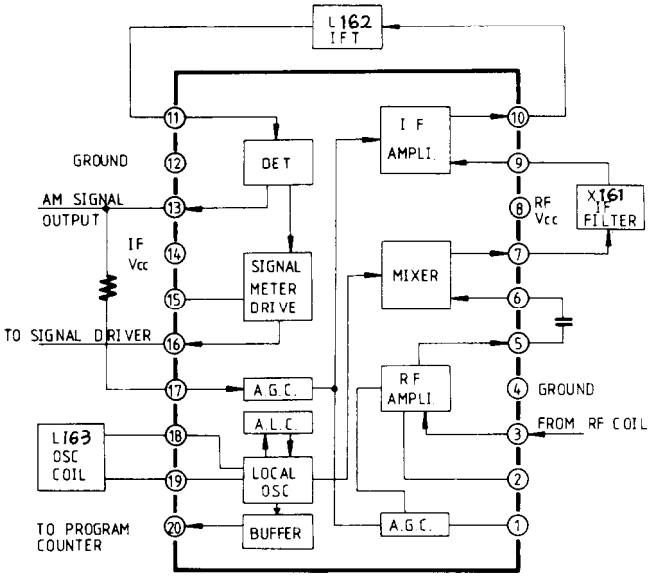
1	CGP	Buzzer drive output and Key return signal source of diode matrix . Active high.
2 3 4 5 6 7 8	Sg Sf Se Sd Sc Sb Sa	Key return signal source output terminals. Active high.
9 10 11 12	K3 K2 K1 K0	Terminals for input of the key return matrix and diode matrix.
13	D6	Tuner output. Active high.
14	D5	Phono output. Active high.
15	D4	Compact disc output. Active high.
16	D3	Video output. Active high.
17	D2	APR defeat output. Active high.
18	D1	Not used.
19 20	X0 X1	Connect to the 4.5MHz crystal oscillator.
21	V_{DD}	Device power terminal; supplies 5V during normal operation and 3V from the super capacitor C804 for memory preservation.
22	AD	A/D converter input terminal.
23 24	E02 E01	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided oscillation frequency is higher than the reference frequency. In the opposite case, Low level is output. Floating occurs when the frequencies match. The output is applied to the variable capacitor diode in the local oscillation circuit of AM/FM through low pass filter Q805 and Q806. The output from both terminals is the same, but only E01 is used.
25	CE	Chip enable input. Device selection signal terminal. High level . . . Normal operation Low level . . . Memory preservation.
26	FM	FM local oscillator input.
27	AM	AM local oscillator input.
28	PSC	Output to control the division ratio of the prescaler.
29	GND	Ground terminal
30	PB3	FM/AM band selector output. FM at the high level.
31	PB2	DX/LOCAL selector output. DX at the high level.
32	PB1	LOAD output.
33	PB0	DATA output
34	PC3	IF band selector output. Wide position at the high level.
35	PC2	Output to switch NR filter. Active high.
36	PC1	Output to switch the hi-blend filter. Active low.
37	PC0	Muitng output. Active high.
38	INT	Remote control input. Not used.
39	PA3	CLOCK output.
40	PA2	RF control input.
41	PA1	Sensor input.
42	PA0	Key return signal input.

LA1235 (FM IF system)

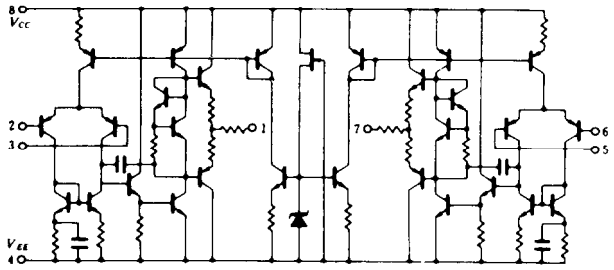


1. IF signal input
2. IF amplifier switch input
   H level: Off
5. Muting switch input
6. Composite signal output
7. AFC output
8. IF amplifier output
9. 10.7MHz input
10. Reference voltage
11. Power supply
12. Muting output
    Tuned: L level
13. Signal strength output
15. Muting level

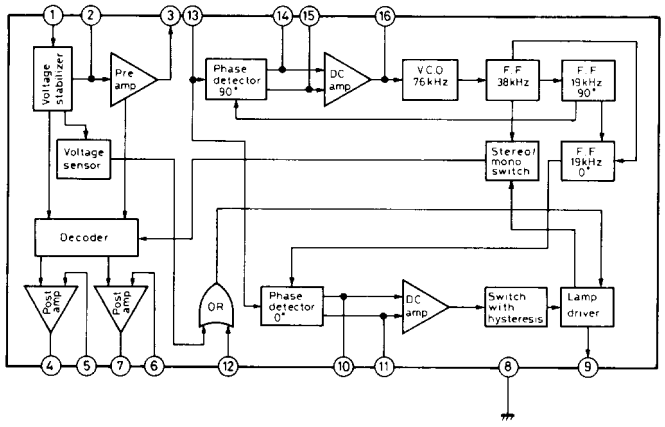
LA1245 (AM radio system)



NJM4558, 4559, 4560 (Operation amplifier)

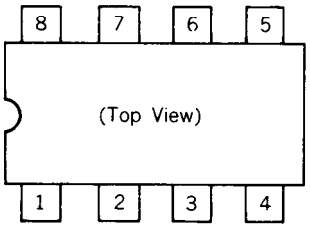


HA12016 (Stereo decoder)



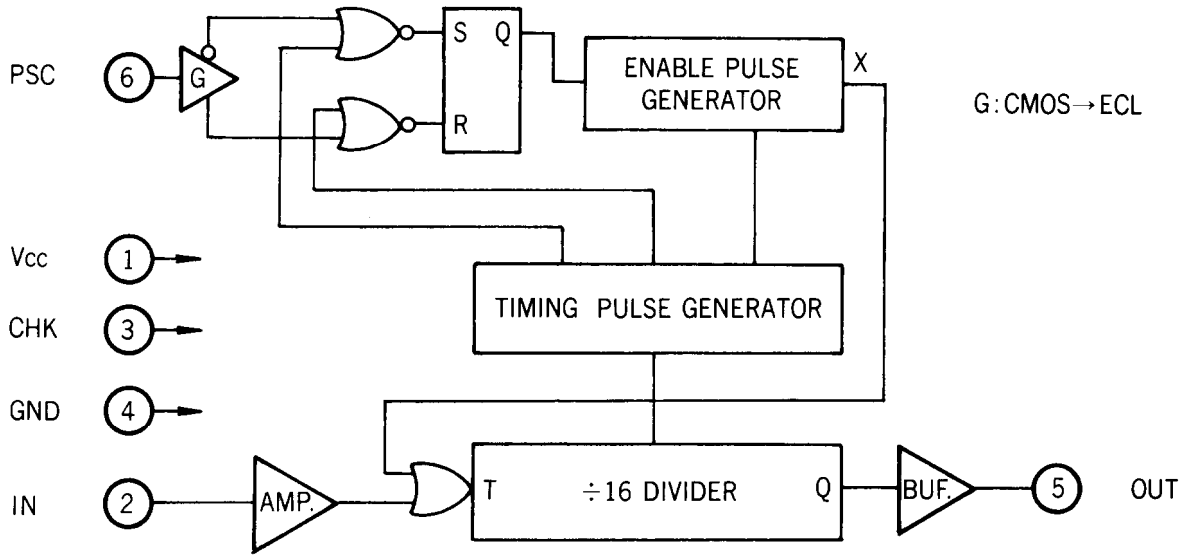
μPB553AC (Prescaler)

Pin Connection

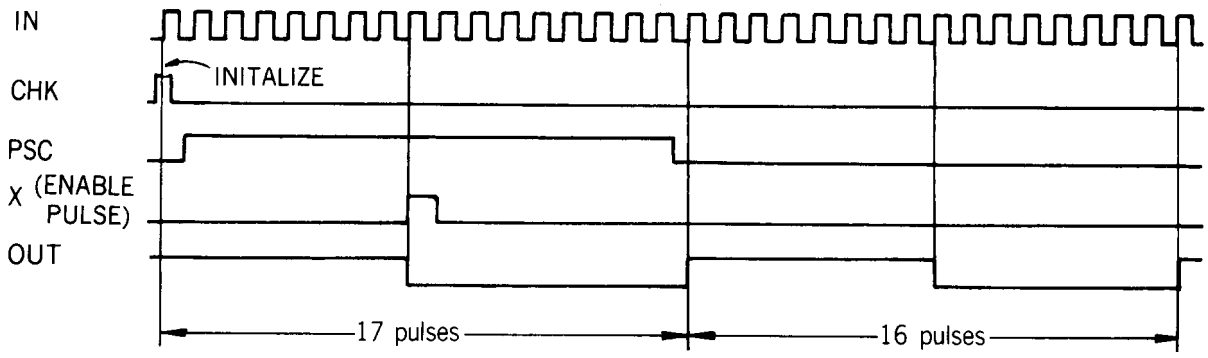


1 Pin 1 (Vcc)..... + 5 volts Supply
2. Pin 2 (IN).....FM local oscillator signal input
3. Pin 3 (CHK).....Check terminal
4. Pin 4 (GND).....Ground terminal
5. Pin 5 (OUT).....Prescaler terminal
6, Pin 6 (PSC).....Prescaler control terminal
7. Pin 7.8.....Not connected

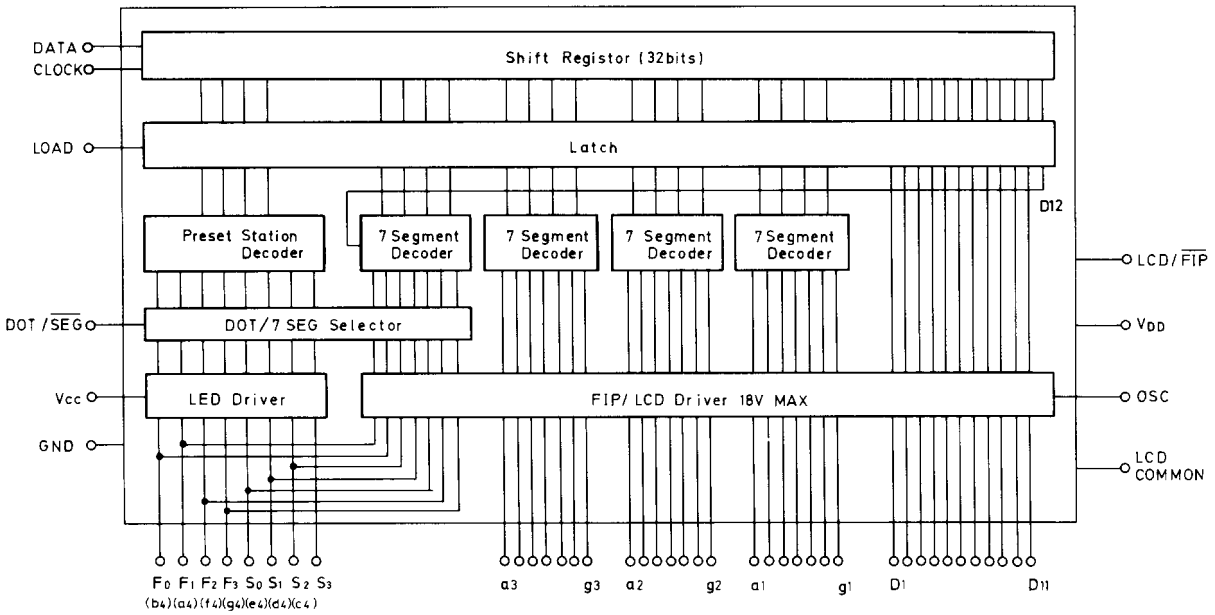
Block Diagram

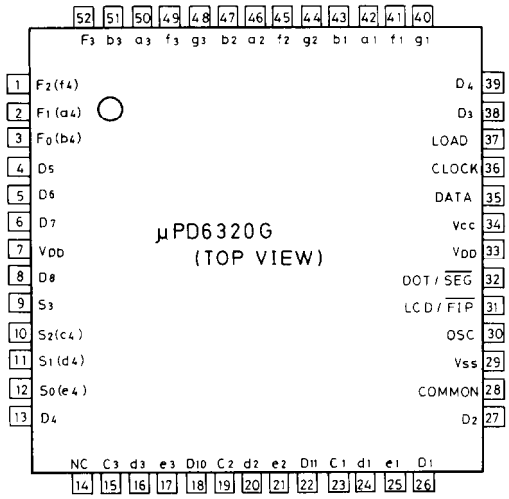


Timing Chart

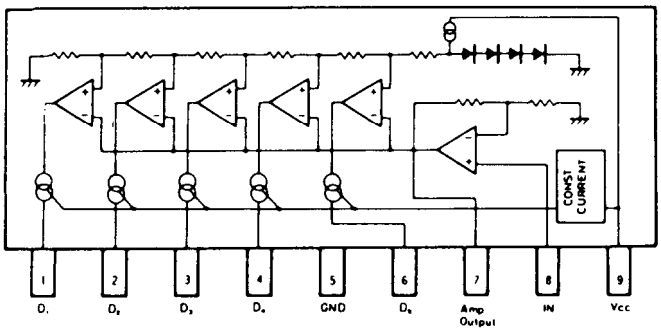


μPD6320G (Indicator drive)

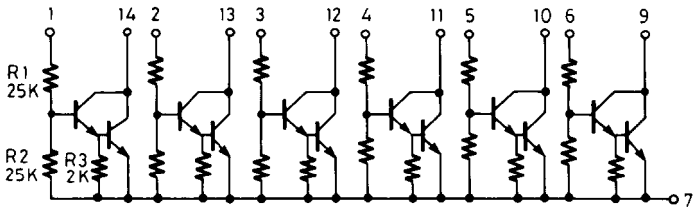




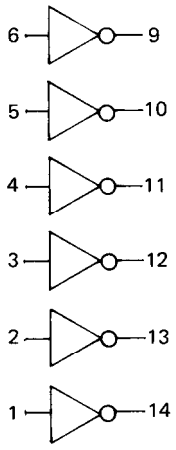
LB1403 (Signal strength indicator driver)



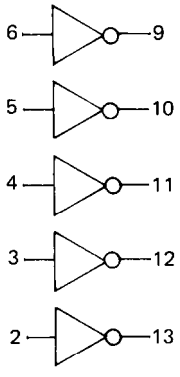
BA612/BA614 (Indicator drive)



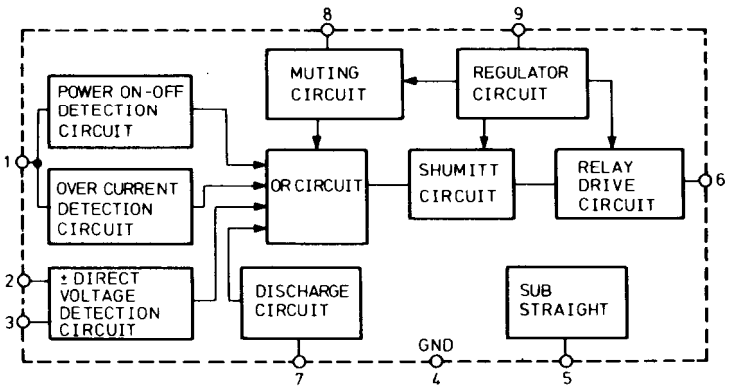
BA614



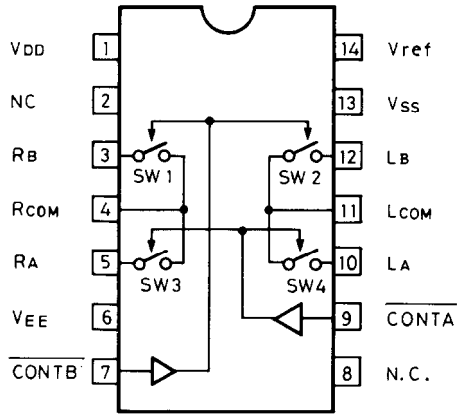
BA612



TA7317P (Protection circuit drive)



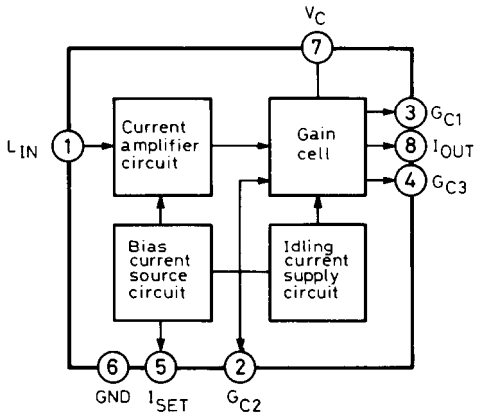
μPD6360C (Analogue switch)



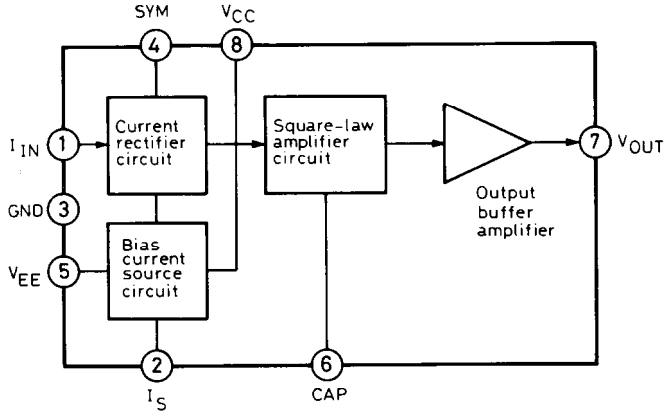
TRUTH TABLE

CONTROL INPUT		SW1, SW2	SW3, SW4
$\overline{\text{CONT A}}$	H	–	OFF
	L	–	ON
$\overline{\text{CONT B}}$	H	OFF	–
	L	ON	–

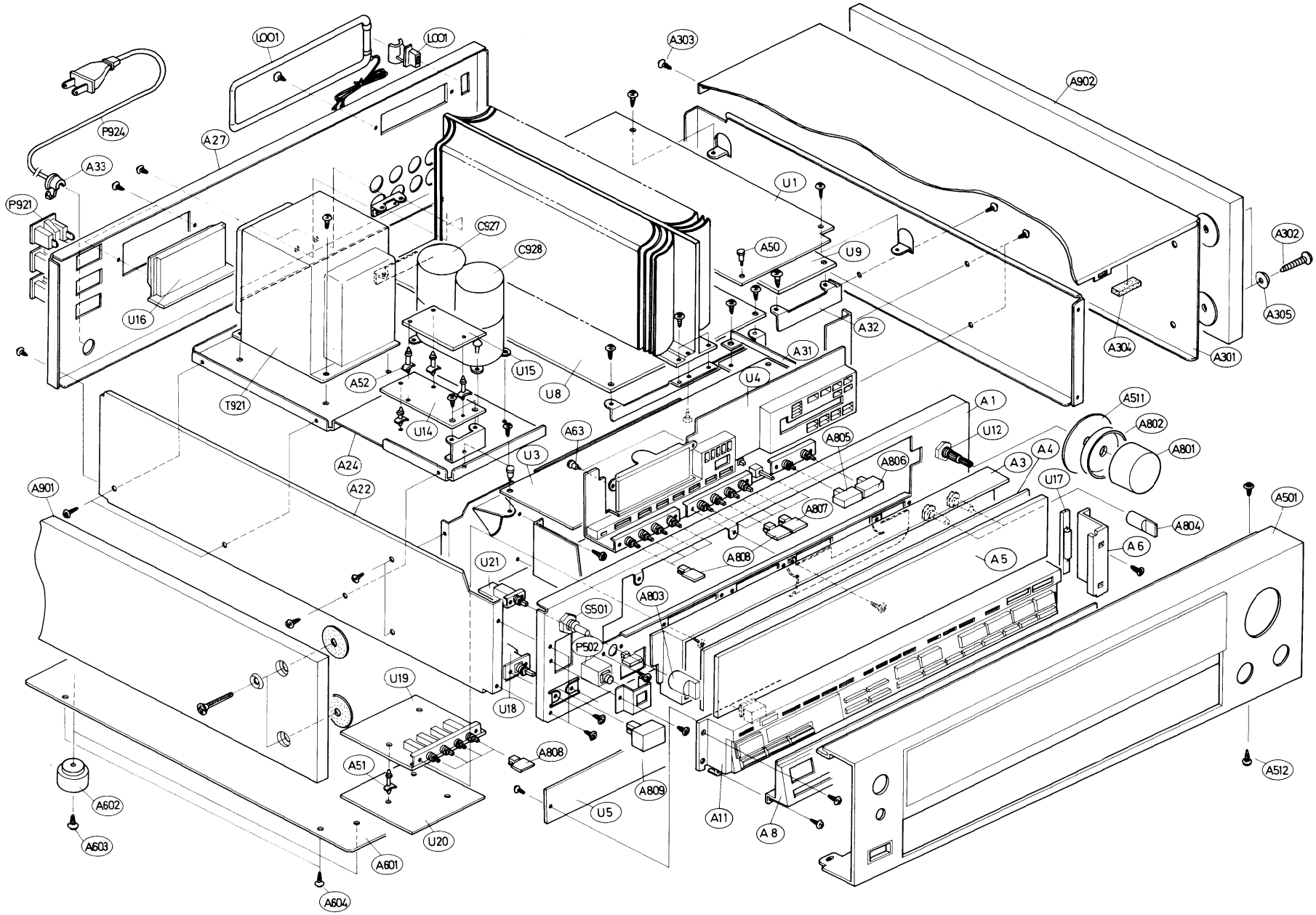
μPC1252H2 (DBX)



μPC1253H2 (Level sensor)



EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A1	27110218A	Front bracket
A2	27140894	Bracket, headphone
A3	27190272	Holder
A4	28133097A	Back plate
A5	28130213A	Dial plate
A6	29105132	Lamp case
A7	27262274	Plate, decoration
A8	27210455	Panel S ass'y — OUTSIDE
	28125147	End cap S, right - INSIDE DRAWERS
	28125148	End cap S, left
A11	28321521A	Holder ass'y, knob (B)
A12	833420068	2TTP+6B (BC), Tapping screw
A13	27160144	Radiator
A14	27140692	Bracket, transistor
A15	260204	Clamp
A16	27150183	Shilded plate
A21	27115160A	Side bracket R
A22	27115161	Side bracket L
A23	27130353	Bracket C
A24	27130320G	Bracket, power transformer
A25	27140778	Bracket P
A26	27130189	Bracket KE
A27	27120576A	Back panel (D)
	27120577	Back panel (W)
A28	27140693	Bracket, back
A31	27130354	Bracket, pc board
A32	27130355	Bracket, pc board
A33	⚠ 270280	SR-4K-4, strainrelief
A51	880004	Rivert
A52	27190164	Holder
A53	834430068	3TTS+6B (BC), Tapping screw
A54	831430088	3TTW+8B (BC), Tapping screw
A55	834230108	3TTS+10B (Ni), Nickel screw
A56	833426060	2.6TTP+6P (BC), Tapping screw
A57	833425059	2.5TTP+5C (BC), Tapping screw
A58	834430108	3TTS+10B (BC), Tapping screw
A59	833430080	3TTP+8P (BC), Tapping screw
A60	82143006	3P+6FN (BC), Pan head screw
A61	834430108	3TTS+10B (BC), Tapping screw
A62	830440089	4TTC+8C (BC), Tapping screw
A63	880009	Rivert
A64	834430128	3TTS+12B (BC), Tapping screw
A65	82142604	2.6P+4F (BC), Pan head screw (W)
A66	863430	N-3F-N (BC), Nut (W)
A71	27140900	Bracket, center
A72	28191252A	Clear plate D
A73	27260062	Shaft, switch
A81	27190011	Holder
A301	28184231	Top cover
A302	836440303	4STU+30CQ (BC), Tapping screw
A303	834430068	3TTS+6B (BC), Tapping screw
A304	28140020	4x10x40mm, Cushion
A305	870086	W4x12 (BC), Washer

REF. NO.	PART NO.	DESCRIPTION
A501	18288121	Front panel ass'y
	27262272	Plate, bass
	27262271	Plate, speaker
	28191255	Clear plate
	27267331	Gauide, power
A511	28140206A	φ60mm, Cushion
A512	834430068	3TTS+6B (BC), Tapping screw
A601	27170177	Bottom board
A602	27175049A	Leg
A603	831430088	3TTW+8B (BC), Tapping screw
A604	834430068	3TTS+6B (BC), Tapping screw
A801	28321486	Knob, volume
A802	28321484-1	Knob, balance
A803	28321517	Knob, speaker
A804	28321515	Knob, bass
A805	28321501	Knob, tape-1
A806	28321502	Knob, tape-2
A808	28321489	Knob, push
A809	28321528	Knob, power
A807	28321488A	Knob, push
A901	28185205A	Side panel L
A902	28185206A	Side panel R
C328, C329	330924730	0.047μF, 50V, Ceramic capacitor
C927, C928	⚠ 3504172	15,000μF, 59V, Elect. capacitor
D505, D605	4000068	VD1222, Diode
F921	⚠ 252051	6A (ST-6), Primary fuse
F922	⚠ 252076	3.15A-SE-EAK, Primary fuse (W)
L001	232085	NMA-3034, AM loop antenna
L001a	27190105	Holder, antenna
P502	25045067	HLJ-0279-01-070, Headphone terminal
P921	⚠ 25050046	NSCT-2P15, AC outlet (D)
	⚠ 25108010	LG-2C, Terminal, primary (W)
P924	⚠ 253112	AS-UC-4#18, Power supply cord (D)
	⚠ 253092-1	AS-CEE-2, Power supply cord (W)
P925	25060044	Ground terminal
P930	223004-1	B-5, Terminal
Q517	2201223 or	2SC2773 (O) or
Q617	2201224	2SC2773 (Y), Transistor
Q518	2201233 or	2SA1169 (O) or
Q618	2201234	2SA1169 (Y), Transistor
R571, R671	441623914	390Ω, 1W, Metal oxide film resistor
S301b	25065204	Remote switch, wire section
S301c	25035194	Remote switch, operation section
S501	25030238	NRSM-144-25Y, Sepaker selector switch
S922	⚠ 25065123	NSS-1258P, Voltage selector switch (W)

REF. NO.	PART NO.	DESCRIPTION
T921	⚠ 230817	NPT-844D, Power transformer (D)
	⚠ 230818	NPT-844DG, Power transformer (W)
U1	18288582A	NARF-1982a, FM/AM tuner pc board ass'y (D)
	18280582C	NARF-1982c, FM/AM tuner pc board ass'y (W)
U2	18120583	NASW-1983, De-emphasis switch pc board ass'y (W)
U3	18288582A	NADG-1984a, Digital circuit pc board ass'y (D)
	18280584C	NADG-1984c, Digital circuit pc board ass'y (W)
U4	18128585	NADIS-1985, Display pc board ass'y
U5	18128586	NASW-1986, Control switch circuit pc board ass'y
U6	18128587	NASW-1987, Switch pc board ass'y
U7	18120588	NASW-1988, Band switch pc board ass'y (W)
U8	18288535A	NAMA-2035a, Power amplifier pc board ass'y
U9	18288589A	NAEQ-1989a, Equalizer amplifier pc board ass'y
U10	18288590A	NASW-1990a, Dynamic bass expander circuit pc board ass'y
U11	18128591	NATC-1991, Tone control circuit pc board ass'y
U12	18128592	NAVR-1992, Volume/Balance control pc board ass'y
U13	18128593	NAPJ-1993, Tape input/output terminal pc board ass'y
U14	18128594	NAPS-1994, Power supply circuit pc board ass'y
U15	18128595	NAPS-1995, Power supply circuit pc board ass'y
U16	18128596	NATRM-1996, Speaker terminal pc board ass'y
U17	18128597	NAPL-1997, Dial illumination lamp pc board ass'y
U18	⚠ 18128598	NASW-1998, Power switch pc board ass'y (D)
	⚠ 18120598A	NASW-1998a, Power switch pc board ass'y (W)
U19	18288599	NADBX-2099, Dbx circuit pc board ass'y
U20	18288500	NADBX-2100, Dbx circuit pc board ass'y
U21	18288501	NALED-2101, LED pc board ass'y

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

ADJUSTMENT PROCEDURES

Preparation

- **Input**

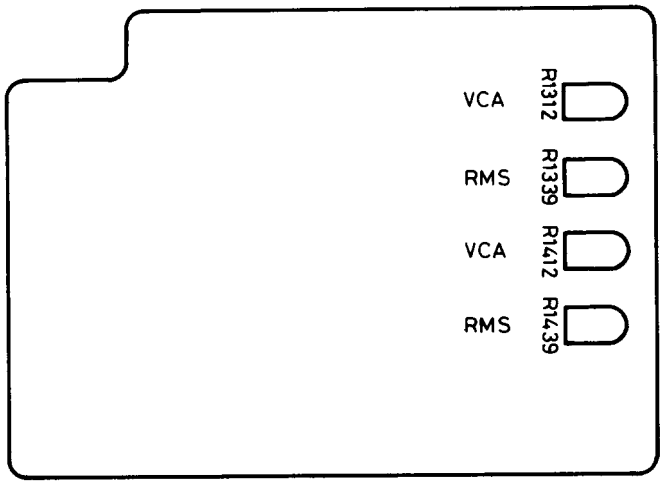
FM mono: 1kHz, 75kHz devi., 60dB/μV
FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz 7.5kHz devi.
AM: 400Hz, 30% mod., 74dB/m

- **Output**

Connect the non-inductive type resistor of 8 ohms to the speaker terminal A of left and right channels unless otherwise noted.

- **Standard knob position**

BASS, TREBLE, BALANCE . . . . . Center
TAPE-1, TAPE-2 . . . . . Off
TUNING LEVEL . . . . . Low
FM MUTING . . . . . On
APR . . . . . On
DYNAMIC BASS EXPANDER . . . . . Off
TOUCH TONE . . . . . On
SUBSNIC, LOUDNESS . . . . . Off
Mode . . . . . Stereo
SPEAKER . . . . . A



Amplifier section

1. Idling current adjustment

Connect the DC voltmeter to the terminals Iid and Vct on the power amplifier pc board.
Adjust the semi-fixed resistors R538 and R638 so that the indication of voltmeter is 10 ± 2mV.

Notes: VOLUME . . . . . Maximum, Open load, Adjust after switching on for 5 minutes.

2. Dynamic bass expander level adjustment

1. Connect the AF oscillator to the input terminal CD on the back panel.
2. Connect the AC voltmeter to the speaker terminal A.
3. Set the AF oscillator output to 70Hz and −31dBV (28mV).
4. Set the Sens switch to −10dB and Level switch to +6dB.
5. Press the Dynamic bass expander switch to on.
6. Set the Volume to −30dB.
7. Turn fully the semi-fixed resistors R353 and R453 counter-clockwise (minimum position).
8. Adjust R353 and R453 so that the output voltage rises up +3dB than minimum position.

3. DBX adjustment

1. Connect the AF oscillator to the playback terminal of TAPE 1.
2. Connect the distortion analyzer to the speaker terminals.
3. Set the AF oscillator output to 100Hz and −10dB (316mV).
4. Set TAPE 1 and TAPE PLAY of dbx SYSTEM to on.
5. Adjust the semi-fixed resistors R1339 and R1439 so that the distortion analyzer reading becomes minimum.
6. Change the frequency of AF oscillator to 10kHz.
7. Adjust the semi-fixed resistors R1312 and R1412 so that the distortion analyzer reading becomes minimum.

ADJUSTMENT PROCEDURES

INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

1. +B2 voltage adjustment

(1) D model

Connect the DC voltmeter between the +B2 and E terminals. Adjust the Semi-fixed resistor R909 so that the indication of voltmeter becomes 25V.

(2) G/W models

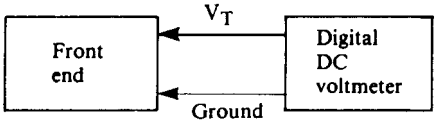
Connect the DC voltmeter between the +B2 and E terminals. Adjust the R909 so that the indication of voltmeter becomes 26.8V. (Before change of zener diode of D714) Adjust the R909 so that the indication of voltmeter becomes 25V. (After change of D714)

Note: When this voltage is low, the fluorescent indicator tube lights off.

Zener diode	Before change	After change
	GZA24Y or GZA22Z	RD22E-B2 or GZA22X

The zener diode D714 is located on the digital circuit pc board.

2. Front end adjustment



Step	Set to dial	Adjust	Output indicator	Adjust for
	FM adjustment			
1	88.1 MHz	L008 (LO)	Digital DC voltmeter	3.03V
2	107.9MHz	TC004 (TCO)		20.8V
3	Repeat steps 1 and 2 as necessary			
	AM adjustment (D model)			
1	600 kHz	L107	Digital DC voltmeter	2.5V
2	1400 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			
	AM adjustment (G/W models)			
1	603 kHz	L107	Digital DC voltmeter	2.5V
2	1404 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			

Remark : Usually not necessary to adjust.

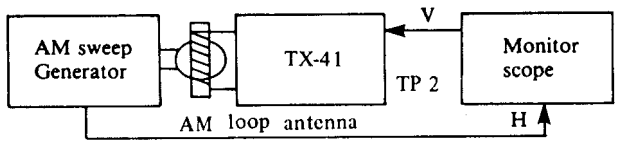
GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position

SPEAKERS . . . . . A
BASS, TERBLE & BALANCE . . . . . Center
MODE . . . . . STEREO
LOUDNESS . . . . . OFF
TAPE 1, 2 . . . . . OFF (SOURCE)

3. AM IF adjustment

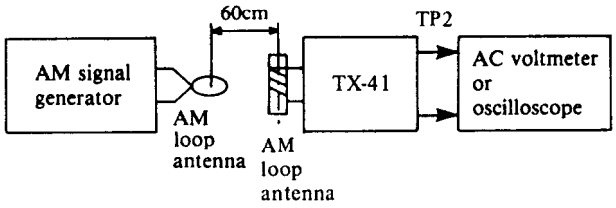
1. Set the dial to quiet point.



Set signal	Adjust	Adjust for
450 kHz	X104	The output of monitor scope becomes maximum symmetrical response

Remark : Usually not necessary to adjust.

4. AM RF adjustment

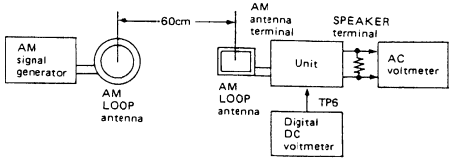


	AM Signal generator	Dial to set	Adjust	Adjust for
1	600kHz (603kHz) 400Hz, 30% mod.	600kHz (603kHz)	L106	Maximum
2	1400kHz (1404kHz) 400Hz, 30% mod.	1400kHz (1404kHz)	C152	Maximum
3	Repeat steps 1 and 2 as necessary			

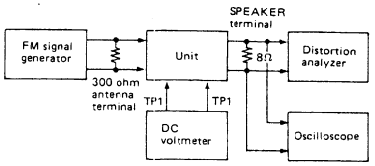
NOTE : ( ) : 220 V model

AM Section

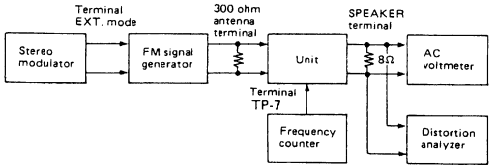
Step	AM SG output	Tuned frequency	Output indicator	Adjust. point	Adjust for	Remarks
1		530 kHz	Digital DC voltmeter	L163	1.0±0.1V	Repeat the steps 1 and 2 until no further adjustment is neccessary.
2		1620 kHz		C183	20.0±0.2V	
3	600 kHz, 400 Hz 30% mod. 74 dB/m	600 kHz	AC voltmeter	L161	Maximum	Repeat the steps 3 and 4 until no further adjustment is neccessary.
4	1400 kHz, 400Hz 30% mod. 74 dB/m	1400 kHz		C162	Maximum	
5	990 kHz, 74 Hz 30% mod. 74 dB/m	990 kHz	AC voltmeter	X161 L162	Maximum	



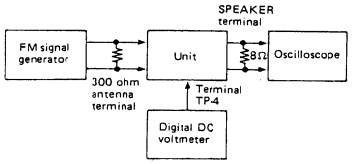
(Fig. 1)



(Fig. 2)



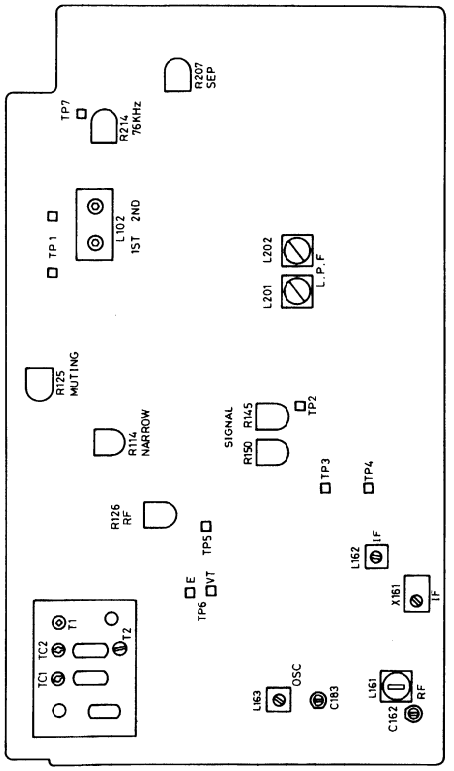
(Fig. 3)



(Fig. 4)

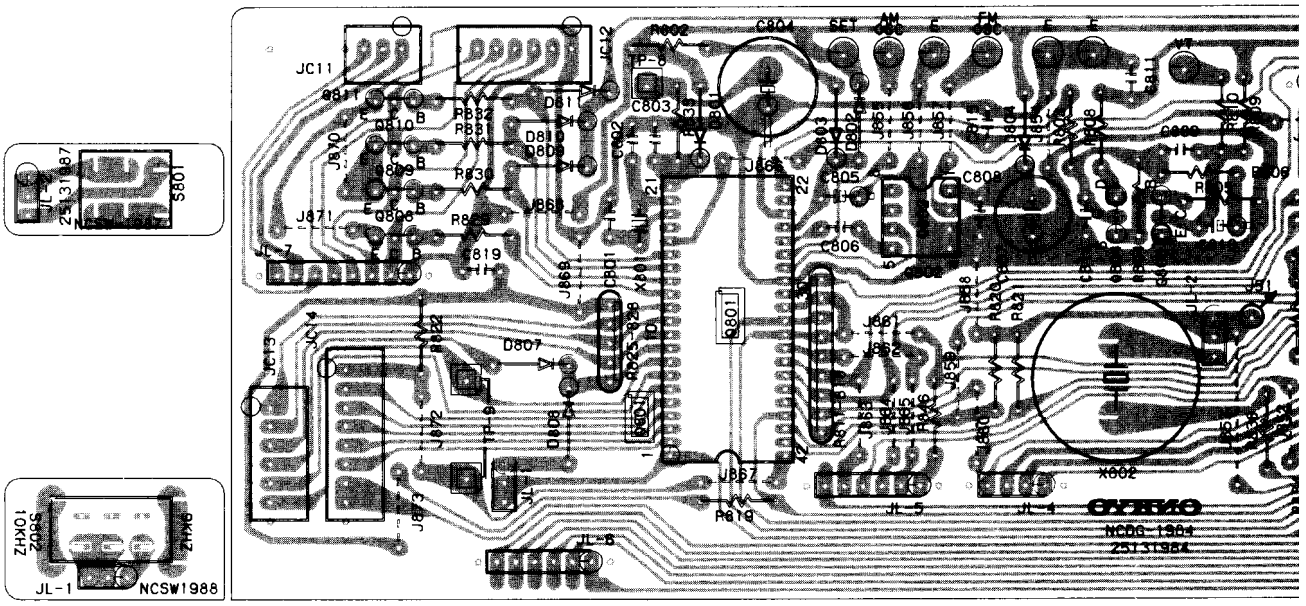
FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment	Adjust for	Remarks
FM IF	1	Fig. 2	99.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB)	–	99.1 MHz	DC voltmeter	L102 1st coil	OV	Muting: off Repeat the steps 1 and 2 until no further adjustment is necessay
	2					Distortion analyzer	L102 2nd coil	Minimum	
VCO		Fig. 3	99.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB)	–	99.1 MHz	Frequency counter	R214	76 kHz±76 Hz	Remove the frequency counter after adjustment
Distortion		Fig. 3	99.1 MHz 65 dBf (60 dBf) Ext. modulation	L+R 1 kHz	99.1 MHz	Distortion analyzer	IF coil on the front end (T2)	Minimum	
Separation	1	Fig. 3	99.1 MHz 65 dBf (60 dB) Ext. modulation	L ch. 1 kHz	99.1 MHz	R ch. AC voltmeter	R207	Minimum	Maximum and same separation
	2			R ch. 1 kHz		L ch. AC voltmeter		Minimum	
IF Band		Fig. 3	99.1 MHz no modulation 25.2 dBf (20 dB)	–	99.1 MHz	NARROW indicator	R145	Light on SIGNAL STRENGTH	APR switch to on
Narrow IF level	1	Fig. 4	99.1 MHz No modulation 25.2 dBf (20 dB)	–	99.1 MHz	DC voltmeter	R114		APR switch to off
	2							Same value as above (step 1)	APR switch to on
APR level	1	Fig. 4	99.1 MHz 17.2 dBf (12 dB)	–	99.1 MHz	DC voltmeter	R150	1.2±0.05V	APR: on Repeat the steps 1 and until no further adjustment is necessary
	2		99.1 MHz 45.2 dBf (40 dB)				R145	3.2±0.1V	
Muting	1	Fig. 4	99.1 MHz 18.2 dBf (13dB)	–	99.1 MHz	Oscilloscope	R125	Signal	TUNING Level : Low
	2		99.1 MHz 17.2 dBf (12 dB)					No signal	



RINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

DIGITAL CIRCUIT PC BOARD

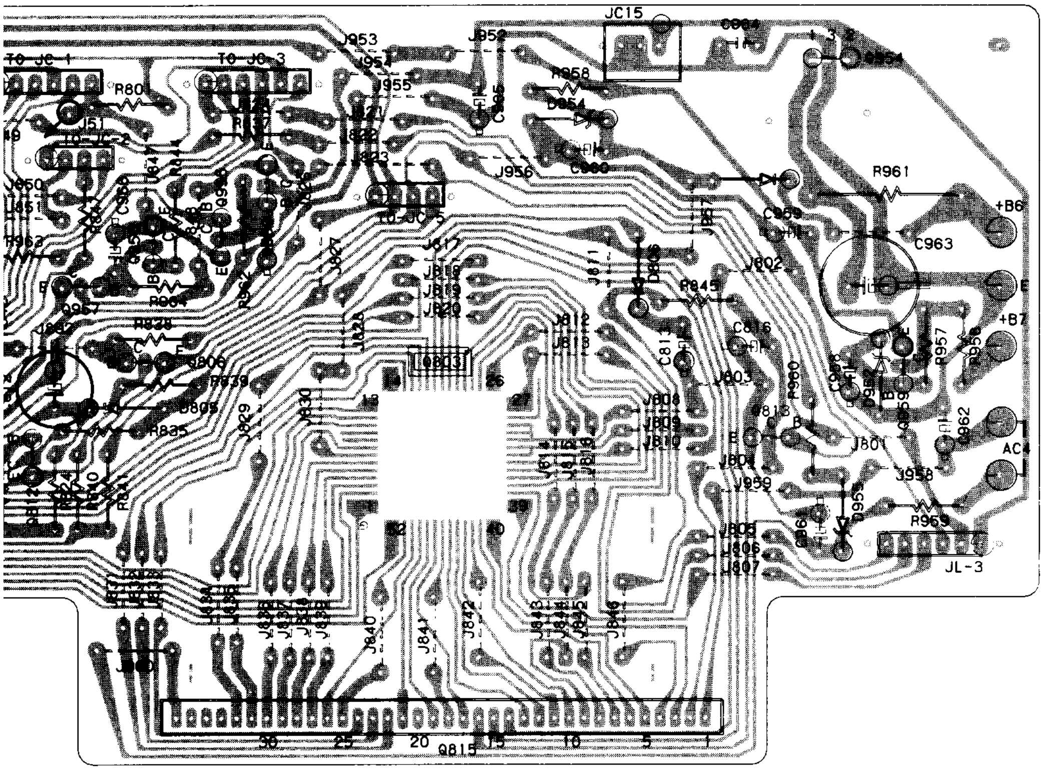


DIGITAL CIRCUIT PC BOARD (NADG-1984a/c)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q801	222769	μPD1712CU-712-513
Q802	222619	μPB553AC
Q803	222770	μPD6320G
Q954	222780062	78M06
	Transistors	
Q804	2112294 or	2SK108 (D) or
	2211293	2SK68 (M)
Q805	2211255	2SC1815 (GR)
Q806	2211255,	2SC1815 (GR),
Q808-Q813	2210746 or	2SC945A (P) or
Q955, Q958	2212485	JC501 (Q)
Q956, Q957	2211705 or	2SD655 (E) or
	2211706	2SD655 (F)
Q959	2211654 or	2SC2235 (Y) or
	2211653	2SC2235 (O)
	Fluorescent tube	
Q815	212023	FIP7F8S
	Diodes	
D801-D806	223133,	DS442X,
D809-D811	223145 or	1S2076TD or
D956	223124	1S2473
D807, D808	223133,	DS442X,
	223145 or	1S2076TD or
	223124	1S2473 (W)
D952	2239792	RD27EB2
D954	2239672 or	RD3. 3EB1 or
	2243252	MTZ15B
D955	2241291	RD3. 3EB1

CIRCUIT NO.	PART NO.	DESCRIPTION
	X'tal	
X801	3010052	XTL-4. 5M
	Buzzer	
X802	241048	PKM24-4A0
	Capacitors	
C804	3020018	0.047F, 5V, Super
C805	352784799	0.47μF, 50V, Elect.
C807	352723319	330μF, 6.3V, Elect.
C810	395160227	2.2μF, 35V, Tantalum
C812	352723319	330μF, 6.3V, Elect.
C816	352780109	1μF, 50V, Elect.
C958	352764709	47μF, 35V, Elect.
C959, C960	352780339	3.3μF, 50V, Elect.
C963	352753319	330μF, 25V, Elect.
C965	352741009	10μF, 16V, Elect.
C966	352780109	1μF, 50V, Elect.
C967	352723319	330μF, 6.3V, Elect.
	Resistors	
R811-R817	49121562408	5.6kΩx8, 1/8W, Network
R825-R828	49121104504	100kΩx4, 1/8W, Network
R958	441523314	330Ω, 1/2W, Metal oxide film
R961	441721804	18Ω, 2W, Metal oxide film
	Radiator	
	27160021	RAD-06B

Note: (W): Only Universal model



CIRCUIT NO.	PART NO.	DESCRIPTION
	Sockets	
	25050140	NJPS-3P-S
	25050143	NJPS-6P-S
	25050145	NJPS-8P-S
	Screws	
	82143010	3P+10F (BC), Pan head
	834430068	3TTS+6B (BC), Tapping
	Bracket	
	27130352	Fluorescent indicator tube

SWITCH PC BOARD (NASW-1987)

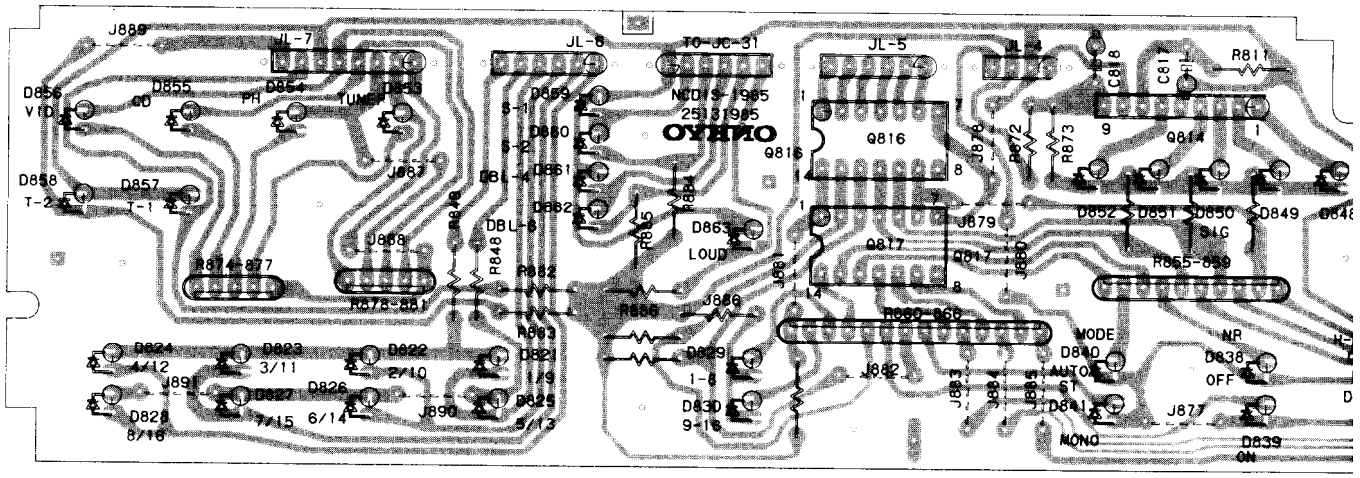
CIRCUIT NO.	PART NO.	DESCRIPTION
S801	25035372	NPS-122-L336, Push

DE-EMPHASIS/BAND SELECTOR SWITCH PC BOARD (NASW-1983/1988) (Only model W)

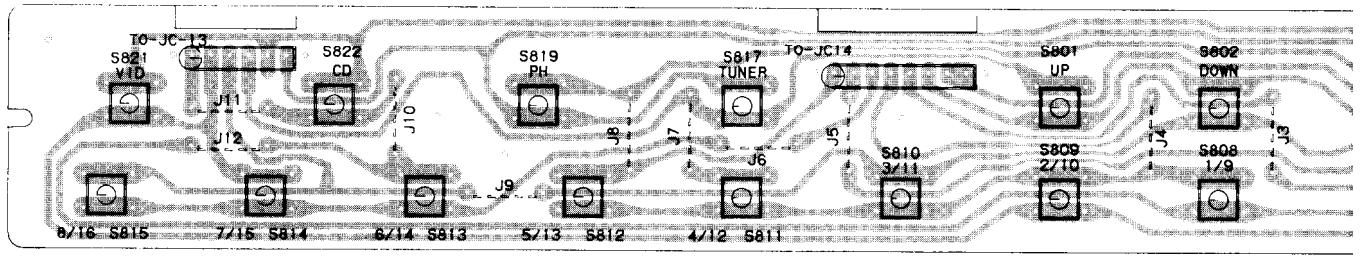
CIRCUIT NO.	PART NO.	DESCRIPTION
	250142	NSS-2225, Push switch

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

DISPLAY CIRCUIT PC BOARD



CONTROL SWITCH CIRCUIT PC BOARD

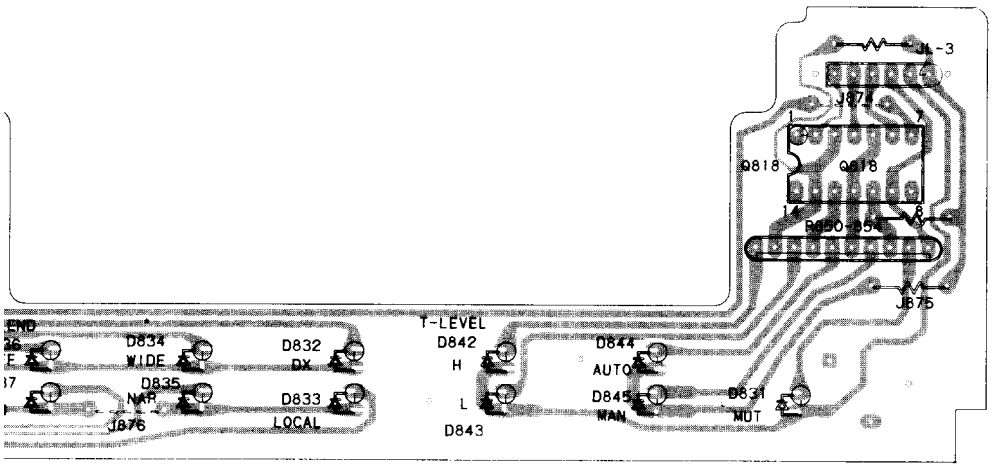


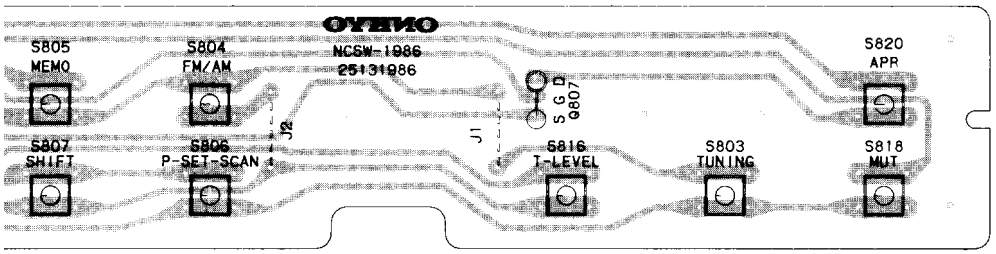
DISPLAY CIRCUIT PC BOARD (NADIS-1985)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q814	222666	LB1403
Q816, Q817	222771	BA614
Q818	222772	BA612
	L.E.Ds	
D821-D832	225137	SEL2413E
D834, D836	225137	SEL2413E
D838, D840	225137	SEL2413E
D842, D844	225137	SEL2413E
D848-D856	222137	SEL2413E
D833, D835	225142	SEL2913K
D837, D839	225142	SEL2913K
D841, D843	225142	SEL2913K
D845	225142	SEL2913K
D857-D863	225142	SEL2913K
	Capacitors	
C817, C818	352741009	10μF, 16V, Elect.
	Resistors	
R850-R854	49241221505	220Ωx5, 1/8W, Network
R855-R859	49241181505	180Ωx5, 1/8W, Network
R860-R866	49241181507	180Ωx7, 1/8W, Network
R874-R877	49121221504	220Ωx4, 1/8W, Network
R878-R881	49121103504	10kΩx4, 1/8W, Network
	Holders	
	27190270B	LED, left
	27190271A	LED, right
	Screws	
	833430080	3TTP+8P (BC), Tapping

CONTROL SWITCH CIRCUIT PC BOARD (NASW-1986)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistor	
Q807	2212304, 2211945 or 2211293	2SK381D, 2SK246 (GR) or 2SK68 (M)
	Switches	
S801-S822	25035389	NPS-111-S353

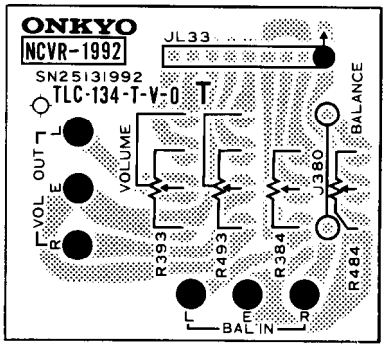




VOLUME/BALANCE CONTROL PC BOARD (NAVR-1992)

CIRCUIT NO.	PART NO.	DESCRIPTION
R384, R484	5104145	N16RDQMC250KMN100 KBTP40, Volume/Balance control variable resistor

VOLUME/BALNCE CONTROL PC BOARD



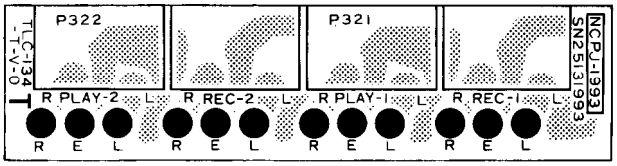
TAPE INPUT/OUTPUT TERMINAL PC BOARD (NAPJ-1993)

CIRCUIT NO.	PART NO.	DESCRIPTION
P321, P322	25045142	NPJ-4PDBL55, Tape input/ output terminal

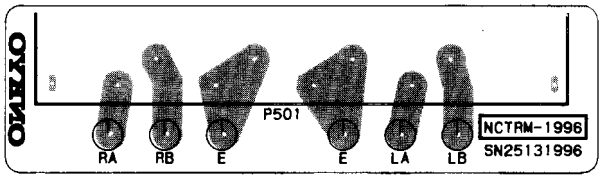
SPEAKER TERMINAL PC BOARD (NATRM-1996)

CIRCUIT NO.	PART NO.	DESCRIPTION
P501	25060058	NTM-8PDML25, Speaker terminal

TAPE INPUT/OUTPUT TERMINAL PC BOARD



SPEAKER TERMINAL PC BOARD



FM/AM TUNER PC BOARD (NARF-1982 a/c)

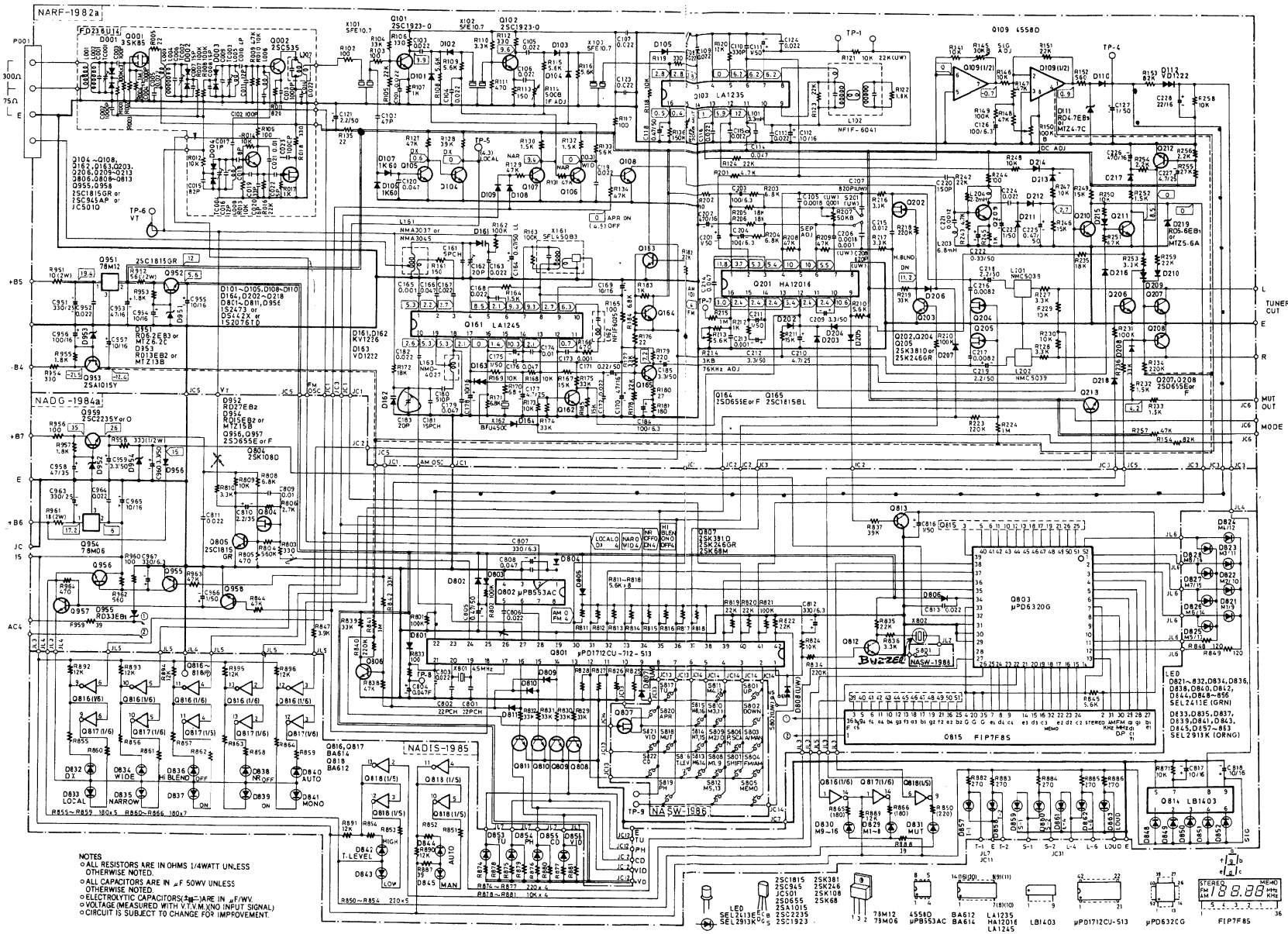
CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240063	BFE496U11
	ICs	
Q103	222680	LA1235
Q109	222465	NJM4558D
Q161	222701	LA1245
Q201	222593	HA12016
Q951	222780122	78M12
	Transistors	
Q101, Q102	2211723	2SC1923 (O)
Q104-Q108	2211255,	2SC1815 (GR),
Q162, Q163	2210746 or	2SC945A (P) or
Q203, Q206	2212485	JC501 (Q)
Q164, Q207	2211705 or	2SD655 (E) or
Q208	2211706	2SD655 (F)
Q165	2211256	2SC1815 (BL)
Q202	2212304 or	2SK381 (D) or
	2211945	2SK246 (GR)
Q204, Q205	2211945 or	2SK246 (GR) or
	2211293	2SK68 (M)
Q209-Q213	2211255,	2SC1815 (GR),
	2210746 or	2SC945A (P) or
	2212485	JC501 (Q)
Q952	2211255	2SC1815 (GR)
Q953	2211454	2SA1015 (Y)
	Diodes	
D101-D105	223145,	1S2076TD,
D108-D110	223133 or	DS442X or
D164	223124	1S2473
D106, D107	223132	1K60
D111	2239433 or	RD4. 7EB3 or
	2243133	MTZ4. 7C
D112, D163	4000068	VD1222
D161, D162	223136	KV1226, Variable capacitor
D202-D218	223145,	1S2076TD,
	223133 or	DS442X or
	223124	1S2473
D219	2239471	RD5. 6EB1 or
	2243151	MTZ5. 6A
D951	2239493 or	RD6. 2EB3 or
	2243163	MTZ6. 2C
D953	2239652 or	RD13EB2 or
	2243242	MTZ13B
	Coils	
L101	233105 or	NCCH-1005 or
	233024	NCCH-1501
L161	232089 or	NMA-3037 or
	232107	NMA-3045
L163	232110	NMO-4027
L201, L202	233291	NMC-5039
L203	231042	NCH-2082
L204	233031	NMC-9-1
	Transformers	
L102	233274	NFIF-6041
L162	232095	NFIF-6025
	Ceramic filters	
X101, X103	3010024	SFE10. 7ML-A
X102	3010070	SFE10. 7MS3GY-A
X161	3010075	SFL450B3
X162	3010076	BFU450C

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C111	352780109	1μF, 50V, Elect.
C112	352741009	10μF, 16V, Elect.
C118	352784799	0.47μF, 50V, Elect.
C121	352780229	2.2μF, 50V, Elect.
C126	352721019	100μF, 6.3V, Elect.
C127	352780109	1μF, 50V, Elect.
C162	3060010	NTC-20P-09, Trimmer
C164	392884797	0.47μF, 50V, LL
C169	352741009	10μF, 16V, Elect.
C170	352744709	47μF, 16V, Elect.
C171	352782299	0.22μF, 50V, Elect.
C175	352780109	1μF, 50V, Elect.
C177	352750479	4.7μF, 25V, Elect.
C178	352741009	10μF, 16V, Elect.
C180	370135114	510pF±5%, 100V, APS
C183	3060010	NTC-20P-09, Trimmer
C184	352721019	100μF, 6.3V, Elect.
C185	352780339	3.3μF, 50V, Elect.
C201	352780109	1μF, 50V, Elect.
C202	352744719	470μF, 16V, Elect.
C203, C204	352721019	100μF, 6.3V, Elect.
C207, C208	370138214	820pF±5%, 100V, APS (W)
C209	352780339	3.3μF, 50V, Elect.
C210	352750479	4.7μF, 25V, Elect.
C211	352780109	1μF, 50V, Elect.
C212	352780339	3.3μF, 50V, Elect.
C213	370131024	1,000pF±5%, 100V, APS
C218, C219	352780229	2.2μF, 50V, Elect.
C222	352783399	0.33μF, 50V, Elect.
C223	352780109	1μF, 50V, Elect.
C225	352784799	0.47μF, 50V, Elect.
C226	352744719	470μF, 16V, Elect.
C227	352750479	4.7μF, 25V, Elect.
C228	352742209	22μF, 16V, Elect.
C951	352753319	330μF, 25V, Elect.
C953	352744709	47μF, 16V, Elect.
C954, C955	352741009	10μF, 16V, Elect.
C956	352741019	100μF, 16V, Elect.
C957	352741009	10μF, 16V, Elect.
	Resistors	
R114	5215041	N08HR500BC, Semi-fixed
R125	5215003	N08HR20KBC, Semi-fixed
R145	5215062	N08HR30KBC, Semi-fixed
R150	5215047	N08HR100KBC, Semi-fixed
R207	5215046	N08HR50KBC, Semi-fixed
R214	5215061	N08HR3KBC, Semi-fixed
R951	441721004	10Ω, 2W, Metal oxide film
R952	441525604	56Ω, 1/2W, Metal oxide film
	Radiator	
	27160011A	RAD-05
	Sockets	
	25050140	NJPS-3P-S
	25050141	NJPS-4P-S
	25050143	NJPS-6P-S
	Terminal	
P001	25060085	NTM-4PDMN29, Antenna
	Screws	
	82143010	3P+10F (BC), Pan head screw
	834430068	3TTS+6B (BC), Tapping
	Nut	
	863430	N-3F-N (BC)

Note: (W): Only Universal model

SCHEMATIC DIAGRAM

TUNER SECTION



POWER AMPLIFIER PC BOARD (NAMA-2035/a)

CIRCUIT NO.	PART NO.	DECRIPTION
	ICs	
Q561, Q661	222502	NJM4558DX
Q702	222584	TA7317P
	Transistors	
Q501, Q601	2211915 or	2SK240 (GR) or
	2211916	2SK240 (BL)
Q502, Q602	2211255	2SC1815 (GR)
Q503, Q603	2211255	2SC1815 (GR)
Q504, Q604	2211515 or	2SA955 (F) or
	2211516	2SA955 (G)
Q505, Q605	2211455	2SA1015 (GR)
Q506, Q606	2211455	2SA1015 (GR)
Q507, Q607	2211255	2SC1815 (GR)
Q508, Q608	2211732 or	2SC1845 (F) or
	2211733	2SC1845 (E)
Q509, Q609	2211792	2SA992 (F) or
	2211793	2SA992 (E)
Q512, Q612	2211743 or	2SA915 (M) or
	2211742	2SA915 (L) ★
Q513, Q613	2211763 or	2SC1940 (M) or
	2211762	2SC1940 (L) ★
Q514, Q614	2211255	2SC1815 (GR)
Q515, Q615	2211923 or	2SC2824 (O) or
	2211924	2SC2824 (Y) ★
Q516, Q616	2211933 or	2SA1184 (O) or
	2211934	2SA1184 (Y) ★
Q517, Q617	2201164 or	2SC2581 (Y) or
	2201163	2SC2581 (O) ★
Q517, Q617	2201224	2SC2273 (Y) or
	2201223	2SC2273 (O) ★
Q518, Q618	2201234 or	2SA1169 (Y) or
	2201233	2SA1169 (O) ★
Q901	2201073 or	2SD880 (O) or
	2201074	2SD880 (Y) ★
Q902	2201243 or	2SB834 (O) or
	2201244	2SB834 (Y) ★
Q903, Q904	2211945 or	2SK246 (GR) or
	2211315	2SK117 (GR)
	Diodes	
D501, D601	223145,	1S2076TD,
	223133 or	DS442X or
	223105	1S1555 (TX-65)
D502-D504	223145,	1S2076TD,
D561, D562	223133 or	DS442X or
D602-D604	223105	1S1555
D661, D662	223145,	1S2076TD,
D703, D705	223133 or	DS442X or
	223105	1S1555
D704	2241072 or	GZA-10Y or
	2241073	GZA-10Z
D901, D902	2241192 or	GZA-18Y or
	2241193	GZA-18Z
	Coils	
L501, L601	231015	S-0. 8C

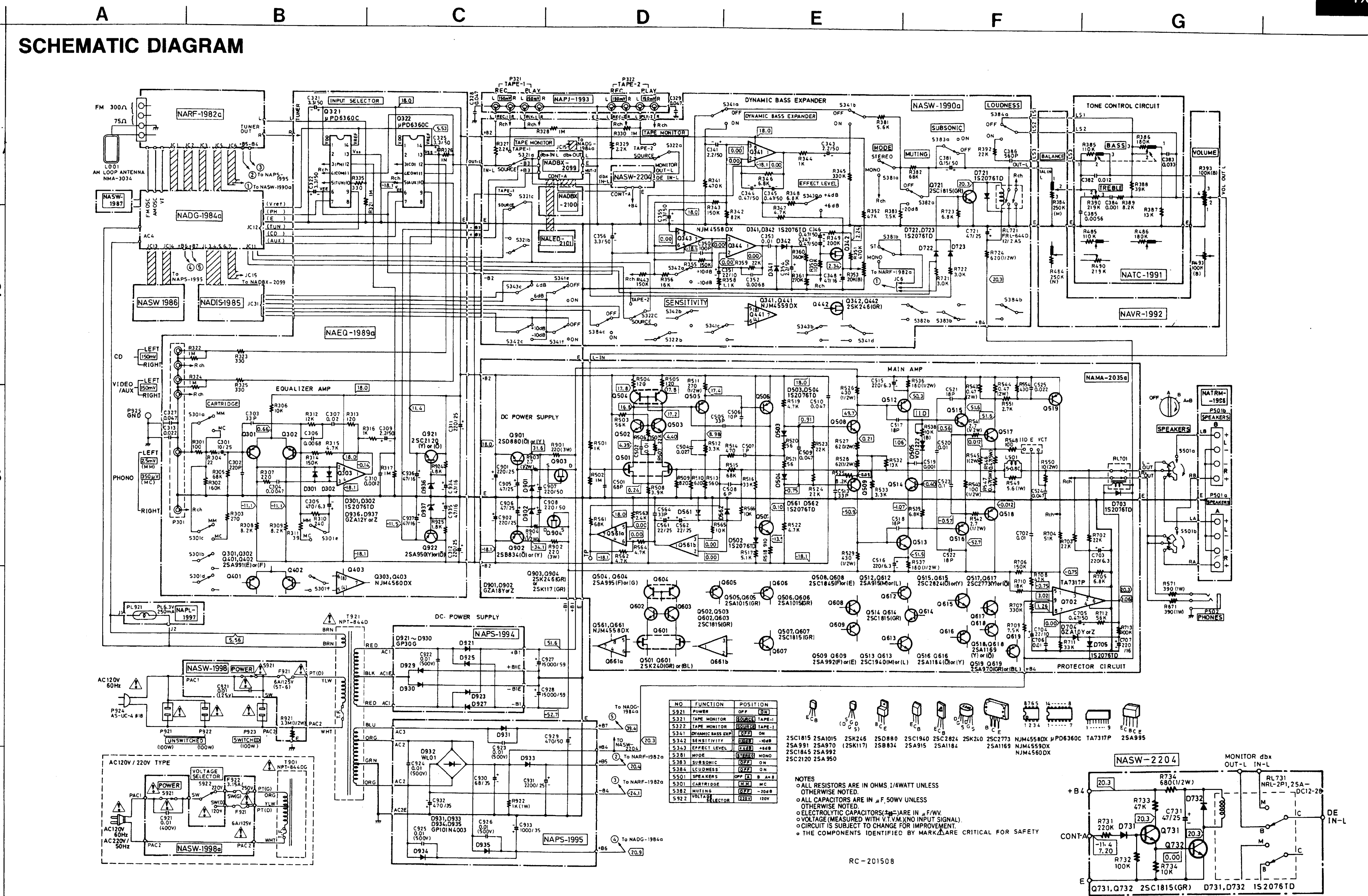
CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C515, C615	352722219	220μF, 6.3V, Elect.
C516, C616		
C561, C661	352752209	22μF, 25V, Elect.
C562, C662	352752209	22μF, 25V, Elect.
C703	352722219	220μF, 6.3V, Elect.
C704	352732209	22μF, 10V, Elect.
C705	352784799	0.47μF, 50V, Elect.
C707	352742219	220μF, 16V, Elect.
C901, C902	352752219	220μF, 25V, Elect.
C905, C906	352754709	47μF, 25V, Elect.
C907, C908	352782219	220μF, 50V, Elect.
	Resistors	
R511, R611	442522714	270Ω, 1/2W, Metal oxide film
R526, R626	442524314	430Ω, 1/2W, Metal oxide film
R529, R529		
R527, R528	441526204	62Ω, 1/2W, Metal oxide film
R627, R628		
R536, R537	442521814	180Ω, 1/2W, Metal oxide film
R636, R637		
R538, R638	5225015	N08HR10KBD, Semi-fixed
R540, R640	442521014	100Ω, 1/2W, Metal oxide film
R541, R542	442520274	2.7Ω, 1/2W, Metal oxide film
R641, R642		
R543, R544	4000063	0.47Ω, 2W, Metal plate
R643, R644		
R545, R645	441620104	1Ω, 1W, Metal oxide film
R546, R547	**4000080**	0.47Ω, 2W, Metal plate
R646, R647		
R549, R649	441620564	5.6Ω, 1W, Metal oxide film
R550, R650	441721004	10Ω, 2W, Metal oxide film
R901, R902	441822214	220Ω, 3W, Metal oxide film
	Relay	
RL701	25065237	NRL-4P3A-DC24-26
	Radiators	
	27160029	RAD-07
	Brackets	
	27140695A	Back
	27140694	Front
	Screws	
	82143010	3P+10FN (BC), Pan head screw
	831430088	3TTW+8B (BC), Tapping

CAUTION: Replacement for transistor of mark ★, if necessary, must be made from the same beta group (H_{EF}) as the original type.

EX. 2SA 1184 (O), 2SC 2581 (O)

Same beta group

SCHEMATIC DIAGRAM



NO	FUNCTION	POSITION
S921	POWER	OFF [ON]
S321	TAPE MONITOR	[SOURCE] TAPE-1
S322	TAPE MONITOR	[SOURCE] TAPE-2
S341	DYNAMIC BASS EXP	[OFF] ON
S342	SENSITIVITY	[+10dB] -10dB
S343	EFFECT LEVEL	[+4dB] +6dB
S381	MODE	[STEREO] MONO
S383	SUBSONIC	[OFF] ON
S384	LOUDNESS	[OFF] ON
S501	SPEAKERS	OFF [A] B A+B
S301	CARTRIDGE	[MM] MC
S382	MUTING	[OFF] -20dB
S922	VOLTAGE SELECTOR	[220V] 120V

NOTES
- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS(±)ARE IN μF/WV.
- VOLTAGE (MEASURED WITH V.T.V.M.)(NO INPUT SIGNAL).
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY

RC-201508

ONKYO CORPORATION

TX85(After change of dbx)

Addition parts:

REF. NO.	PART NO.	DESCRIPTION
U22	18288504	NASW-2204, Relay drive circuit pc board ass'y
	29355113	Caution sheet, dbx

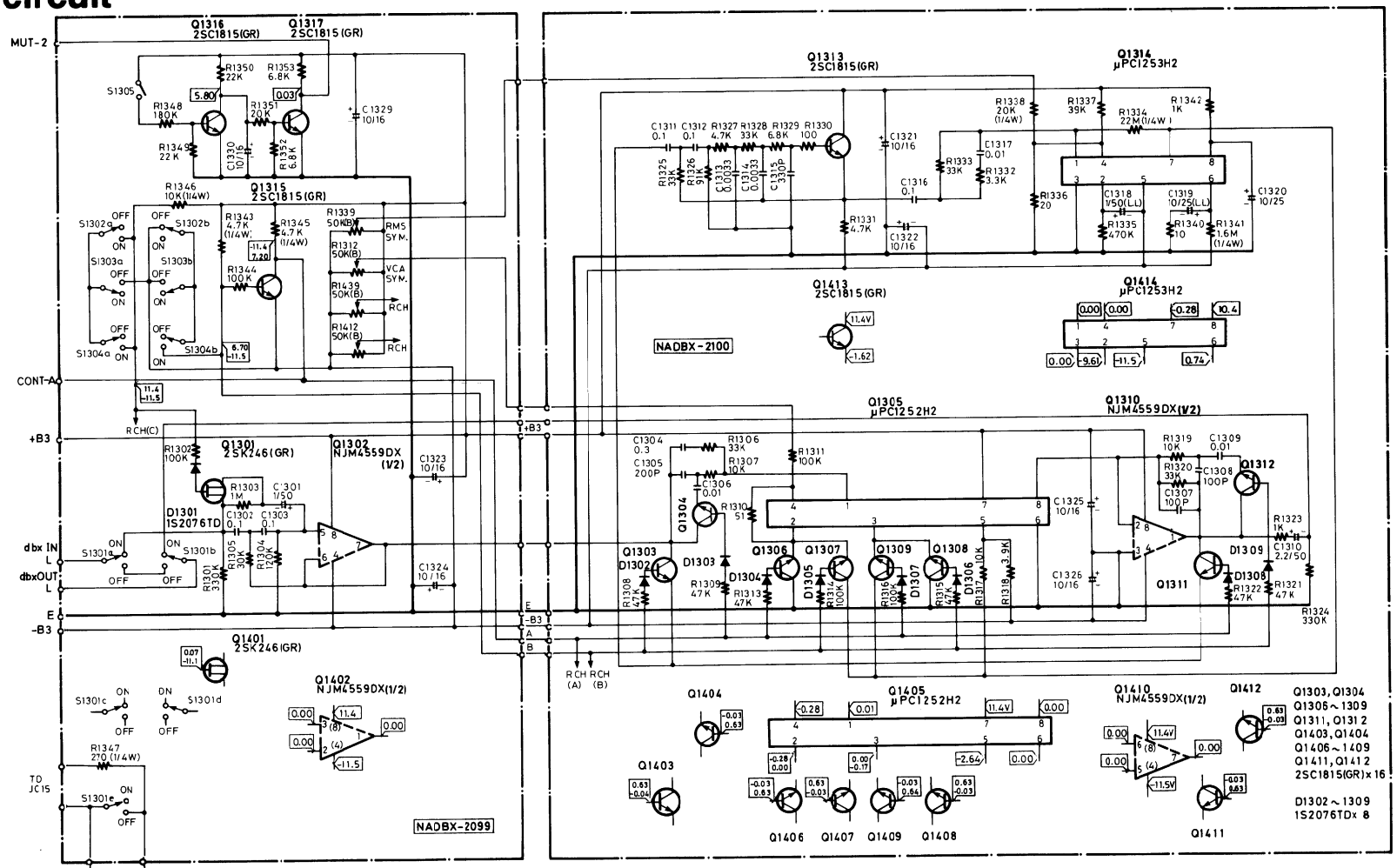
PRINTED CIRCUIT BOARD—PARTS LIST
RELAY DRIVE CIRCUIT PC BOARD(NASW-2204)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q731,Q732	2211255or	2SC1815(GR)or
	2210746	2SC945A(P)
	Diodes	
D731,D732	223145,	1S2076TD,
	223133 or	DX442X or
	223105	1S1555
	Capacitor	
C731	352744709	47μF, 25V, Elect.
	Resistors	
R731	417412244	220kohm,1/ 4W,Carbon
R732	417411044	100kohm,1/ 4W,Carbom
R733	417414734	47kohm,1/ 4W,Carbon
R734	417411034	10kohm,1/ 4W,Carbon
R735	441526814	680kohm,1/ 2W,Metal oxide film
	Relay	
RL731	25065247	NRL-2P1.25A-DC12-28

Appl ication:After 1541 pcs.(Refer serial number of last four digits.)

SCHEMATIC DIAGRAM

dbx circuit



NO.	FUNCTION	POSITION	
S1301	dbx SYSTEM	ON	OFF
S1302	DISC PLAY	ON	OFF
S1303	TAPE PLAY	ON	OFF
S1304	TAPE REC	ON	OFF
S1305	MUTING	ON	OFF

Q1302,Q1402 Q1310,Q1410 | Q1301,Q1401 | Q1303,Q1304 Q1306~1309 Q1311~1313 Q1315~1317 | Q1403,Q1404 Q1406~1409 Q1411~1413 | Q1305,Q1405 Q1314,Q1414

NOTES
- ALL RESISTORS ARE IN OHMS 1/6WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS(±=)ARE IN μF/WV.
- VOLTAGE(MEASURED WITH V.T.V.M.)(NO INPUT SIGNAL)
- S1301~S1305 GANG
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY.

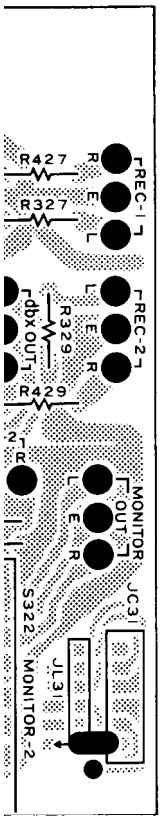
Q1303,Q1304
Q1306~1309
Q1311,Q1312
Q1403,Q1404
Q1406~1409
Q1411,Q1412
2SC1815(GR)x16

D1302~1309
1S2076TDx8

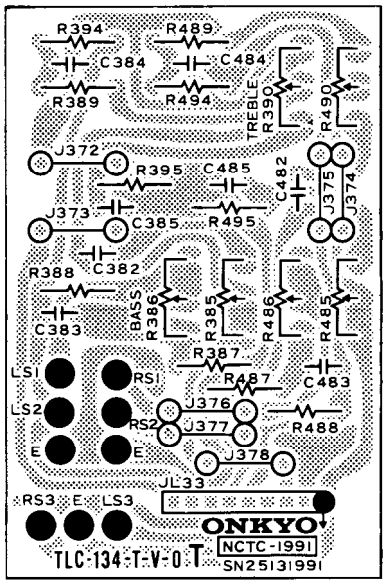
EQUALIZER AMPLIFIER PC BOARD (NAEQ-1989a)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q303, Q403	222570	NJM-4560DX
Q321, Q322	222768	μPD-6360C
	Transistors	
Q301, Q302	2211783 or	2SA991 (E) or
Q401, Q402	2211782	2SA991 (F) ★
Q921	2211164 or	2SC2120 (Y) or
	2211163	2SC2120 (O)
Q922	2211504 or	2SA950 (Y) or
	2211503	2SA950 (O)
	Diodes	
D301, D302	223145	1S2076TD
D401, D402	223145	1S2076TD
D963, D964	2241112 or	GZA12Y or
	2241113	GZA12X
	Capacitors	
C301, C401	352751009	10μF, 25V, Elect.
C305, C405	352724719	470μF, 6.3V, Elect.
C309, C409	352780228	2.2μF, 50V, Elect.
C311, C312	352751019	100μF, 25V, Elect.
C321, C322	352780339	3.3μF, 50V, Elect.
C325	352780339	3.3μF, 50V, Elect.
C934-C937	352744709	47μF, 16V, Elect.
	Terminal	
P301	25045143	NPJ-6PDBL56, Input
	Switch	
S301a	25065214	NSS-62103

CAUTION: Replacement for transistor of mark ★, if necessary, must be made from the same beta group (H_{FE}) as the original type.



TONE CONTROL PC BOARD



DYNAMIC BASS EXPANDER CIRCUIT PC BOARD (NASW-1990)

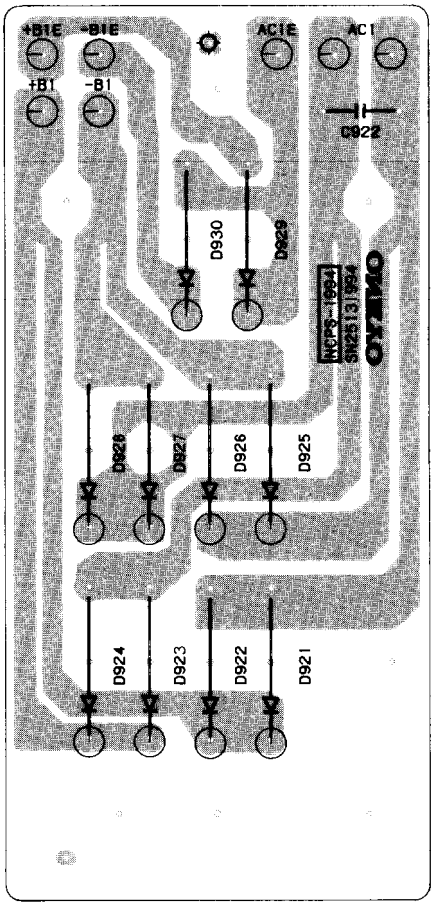
CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q341, Q441	222534	NJM-4559DX
Q343, Q344	222502	NJM-4558DX
	Transistors	
Q342, Q442	2211945	2SK246 (GR)
Q721	2211255	2SC1815 (GR)
	Diodes	
D341, D342	223145,	1S2076TD,
D721, D722	223133 or	DS442X or
D723	223105	1S1555
	Capacitors	
C341, C441	352780229	2.2μF, 50V, Elect.
C343, C443	352780229	2.2μF, 50V, Elect.
C344-C347	352784799	0.47μF, 50V, Elect.
C348, C448	352734709	47μF, 16V, Elect.
C351	352732209	22μF, 10V, Elect.
C354	352780229	2.2μF, 50V, Elect.
C355, C356	352780339	3.3μF, 50V, Elect.
C381, C481	352781599	0.15μF, 50V, Elect.
C444-C447	352784799	0.47μF, 50V, Elect.
C721	352754709	47μF, 25V, Elect.
	Resistors	
R353, R453	5215022	N08HR20KBC, Semi-fixed
R724	441526214	620Ω, 1/2W, Metal oxide film
	Switches	
S321, S322	25035423	NPS-242-L387, Tape 1/2
S341-S343	25035425	NPS-242-122-162-L
S384		389, Expander/Loudness
S381-S383	25035431	NPS-322-L395, Mode/Subsonic/ Mute
	Relay	
RL721	25065048	FRL-644D12/2AS
	Socket	
	25050143	NJPS-6P-S

TONE CONTROL CIRCUIT PC BOARD (NATC-1991)

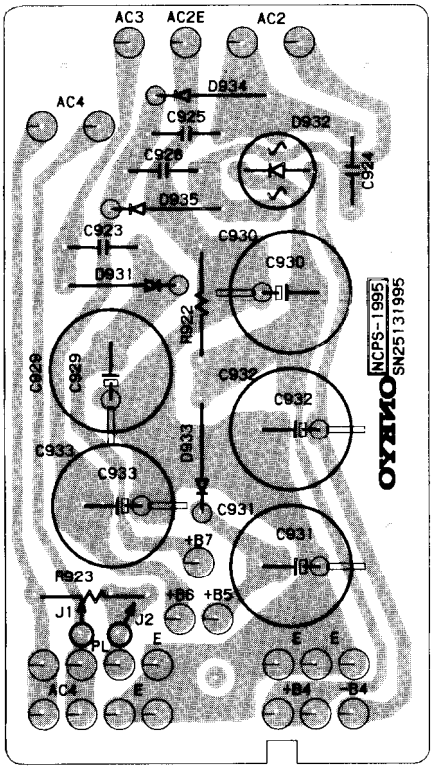
CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R385, R485	5148092	N16RQM11C110K180K 25M Bass
R390, R490	5148091	N16RGM11C219K25M, Treble

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

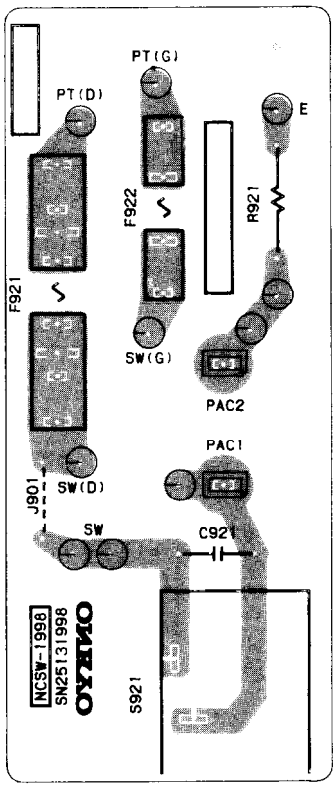
POWER SUPPLY CIRCUIT PC BOARD



POWER SUPPLY CIRCUIT PC BOARD



POWER SWITCH PC BOARD



POWER SUPPLY CIRCUIT PC BOARD (NAPS-1994)

CIRCUIT NO.	PART NO.	DESCRIPTION
D921, D923 D925, D927 D929, D930	223841	GP-30G, Diode

POWER SUPPLY CIRCUIT PC BOARD (NAPS-1995)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D931, D933	223880	GP101N4003
D934, D935	223880	GP101N4003
D932	223862	WL01
	Capacitors	
C929	352784719	470μF, 50V, Elect.
C930	352766809	68μF, 35V, Elect.
C931	352752229	2,200μF, 25V, Elect.
C932	352764719	470μF, 35V, Elect.
C933	352761029	1,000μF, 35V, Elect.
	Resistor	
R922	441621024	1kΩ, 1W, Metal ofide film

DIAL ILLUMINATION LAMP PC BOARD (NAPL-1997)

CIRCUIT NO.	PART NO.	DESCRIPTION
PL921	210064A	250mA, 6.3V, Lamp

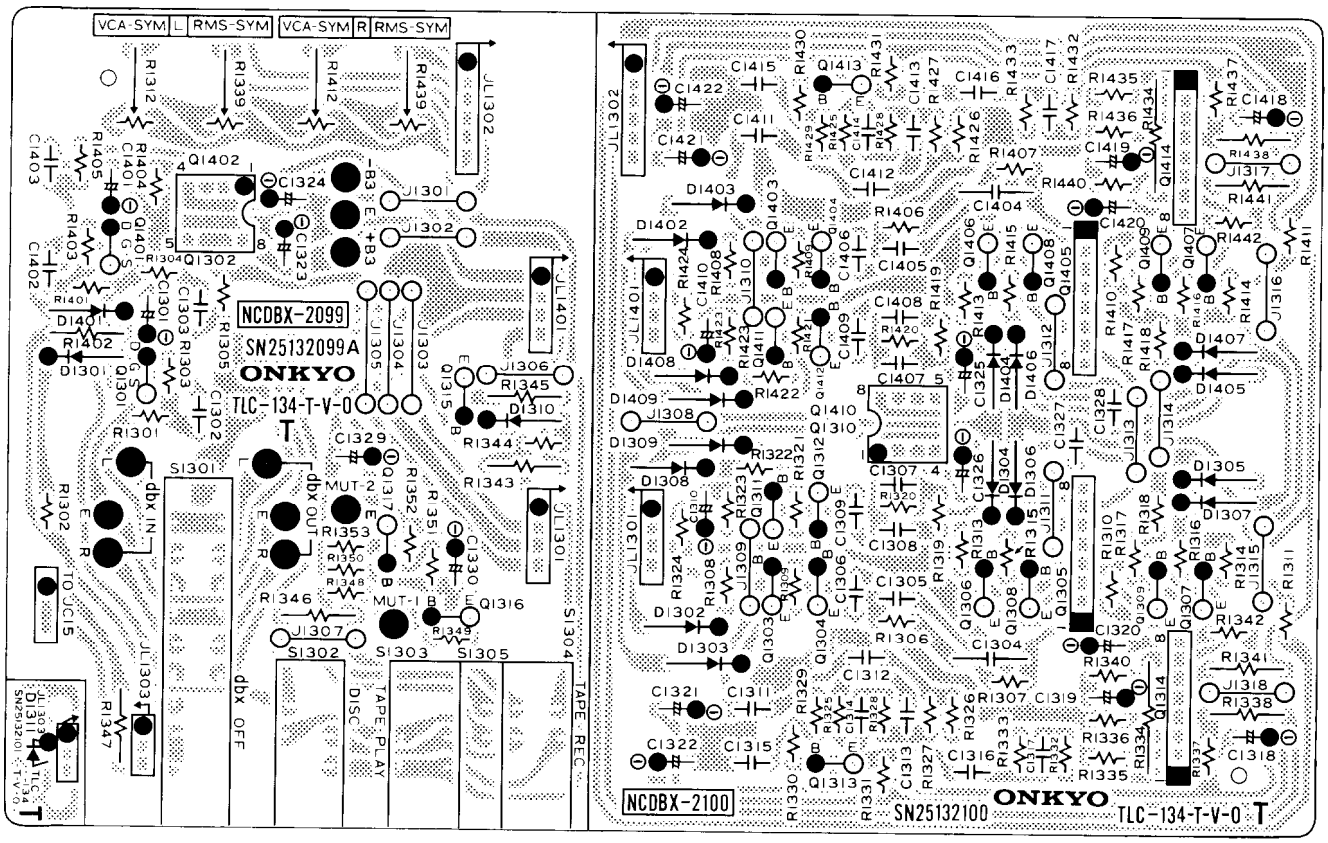
POWER SWITCH PC BOARD (NASW-1998/a)

CIRCUIT NO.	PART NO.	DESCRIPTION
⚠ C921	3500065A	0.01μF, AC400V/125V, Capacitor IS
⚠ R921	431523355	3.3MΩ, 1/2W, Solid resistor (D)
⚠ S921	25035015A	NPS-111-LA3, Power switch
⚠ F921	252051	6A (ST-6), Primary fuse
⚠ F921a	250113	SN5051
⚠ F922	252076	3.15A-SE-EA, Primary fuse (W)
⚠ F922a	25050065	YSH403T, Fuseholder (W)
⚠ C921a	27300601	Cover, capacitor

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CIRTICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

Note (D): Only 120V model
(W): Only Universal model

DBX CIRCUIT PC BOARD



DBX CIRCUIT PC BOARD (NADBX-2099)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q1302, Q1402	222534	NJM4559DX
	Transistors	
Q1301, Q1401	2211945	2SK246 (GR)
Q1315-Q1317	2211255 or	2SC1815 (GR) or
	2210746	2SC945A (P)
	Diodes	
D1301, D1401	223145,	1S2976TD,
	223133 or	DS442X or
	223105	1S1555
	Capacitors	
C1301, C1401	352780109	1μF, 50V, Elect.
C1323, C1324	352741009	10μF, 16V, Elect.
C1329, C1330		
	Resistors	
R1312, R1339	5215023	N08HR50KBC, Semifixed
R1412, R1439		
	Switches	
S1301-S1305	25035432	NPS-162-322-L396

LED PC BOARD (NALED-2101)

CIRCUIT NO.	PART NO.	DESCRIPTION
D1311	225141	SEL2213C

DBX CIRCUIT PC BOARD (NADBX-2100)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q1305, Q1405	222805	μPC-1252H2
Q1310, Q1410	222534	NJM-4559DX
Q1314, Q1414	222806	μPC-1253H2
	Transistors	
Q1303, Q1304	2211255 or	2SC1815 (GR) or
Q1306-Q1309	2210746	2SC945A (P)
Q1311-Q1313	2211255 or	2SC1815 (GR) or
Q1403, Q1404	2210746	2SC945A (P)
Q1406-Q1409	2211255 or	2SC1815 (GR) or
Q1411-Q1413	2210746	2SC945A (P)
	Diodes	
D1302-D1309	223145,	1S2076TD,
D1402-D1409	223133 or	DS442X or
	223105	1S1555
	Capacitors	
C1310, C1410	352780229	2.2μF, 50V, Elect.
C1318, C1418	392880107	1μF, 50V, LL
C1319, C1419	392851005	10μF, 25V, LL
C1320, C1420	352751009	10μF, 25V, Elect.
C1321, C1421	352741009	10μF, 16V, Elect.
C1322, C1422		
C1325, C1326		
	Resistors	
R1334, R1434	431422267	22MΩ, 1/4W, Solid